

FUEL INJECTION (FUEL SYSTEMS)(H4DO)

FU(H4DO)

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4. Intake Manifold Assembly
5. Fuel Pipe Protector
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FUEL INJECTION (FUEL SYSTEMS)(H4DO) > General Description

CAUTION

- When performing service operation, refer to "Repair Contents" in "General Description".  [Ref. to REPAIR CONTENTS>Repair Contents](#).
- Prior to starting work, pay special attention to the following:
 - Always wear work clothes, a work cap, and protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
 - Protect the vehicle using a seat cover, fender cover, etc.
 - Prepare the service tools, clean cloth, containers to catch grease and oil, etc.
- Prevent scattering of grease and oil. If it scatters, wipe it off immediately to prevent it from penetrating the floor or flowing out, to protect the environmental.
- If the grease and oil is spilt over the engine, exhaust pipe or the under cover, completely wipe it off to avoid emission of smoke or causing a fire.
- Vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.
- When performing a repair, identify the cause of trouble and avoid unnecessary work.
- Before disconnecting connectors of sensors or units, be sure to disconnect the ground terminal from the battery sensor.
- Always use the jack-up point when the lifting device, shop jacks or rigid racks are used to support the vehicle.
- Before starting works, remove dirt and corrosion around the target area.
- Keep the removed parts in order and protect them from dust and dirt.
- All removed parts, if to be reused, should be reinstalled in the original positions with attention to the correct directions, etc.
- For the parts except for the non-reusable parts, replace then with new parts if necessary.
- Be sure to tighten bolts and nuts to the specified torque.
- Always use new application oil during work.
- When working on the fuel lines, place "NO OPEN FLAMES" signs near the working area.
- Always ventilate sufficiently when working on the fuel lines.
- Always inspect for fuel leaks after working on the fuel lines is completed.
- Follow all government and local regulations concerning disposal of refuse when disposing fuel.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > General Description

SPECIFICATION

1. FUEL TANK

Capacity	50 L (13.2 US gal, 11.0 Imp gal)
Location	Under rear seat

2. FUEL PUMP

Type	Impeller
Shutoff discharge pressure	1140 kPa (11.62 kg/cm ² , 165.3 psi) or less
Discharge rate	145.6 L (38.5 US gal, 32.0 Imp gal)/h or more [12.5 V at 400 kPa (4.1 kg/cm ² , 58.0 psi)]

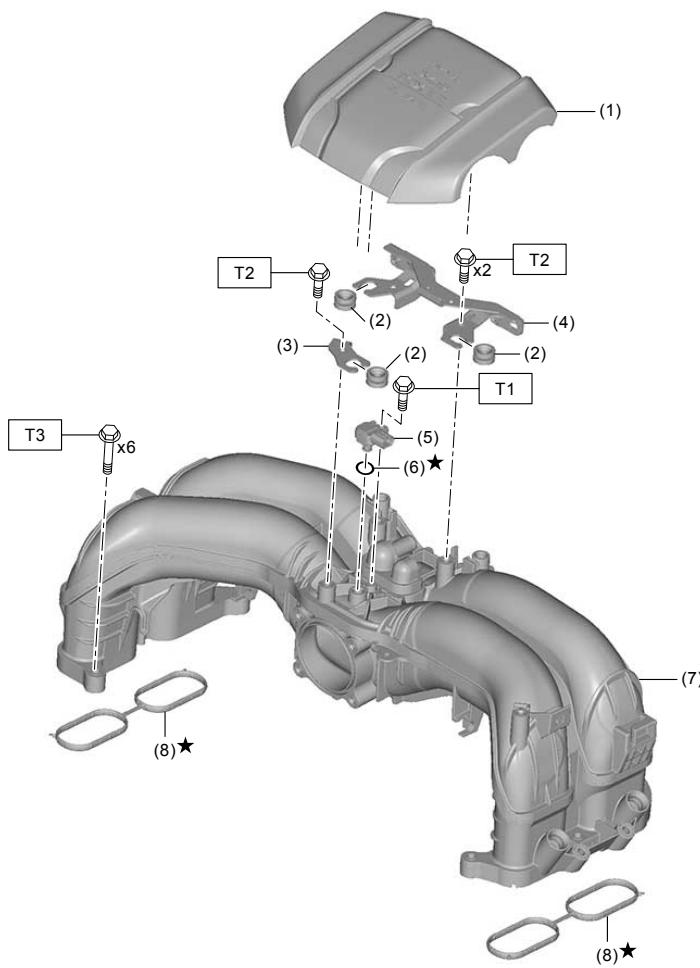
3. FUEL FILTER

Fuel filter	In-tank type
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FUEL INJECTION (FUEL SYSTEMS)(H4DO) > General Description

COMPONENT

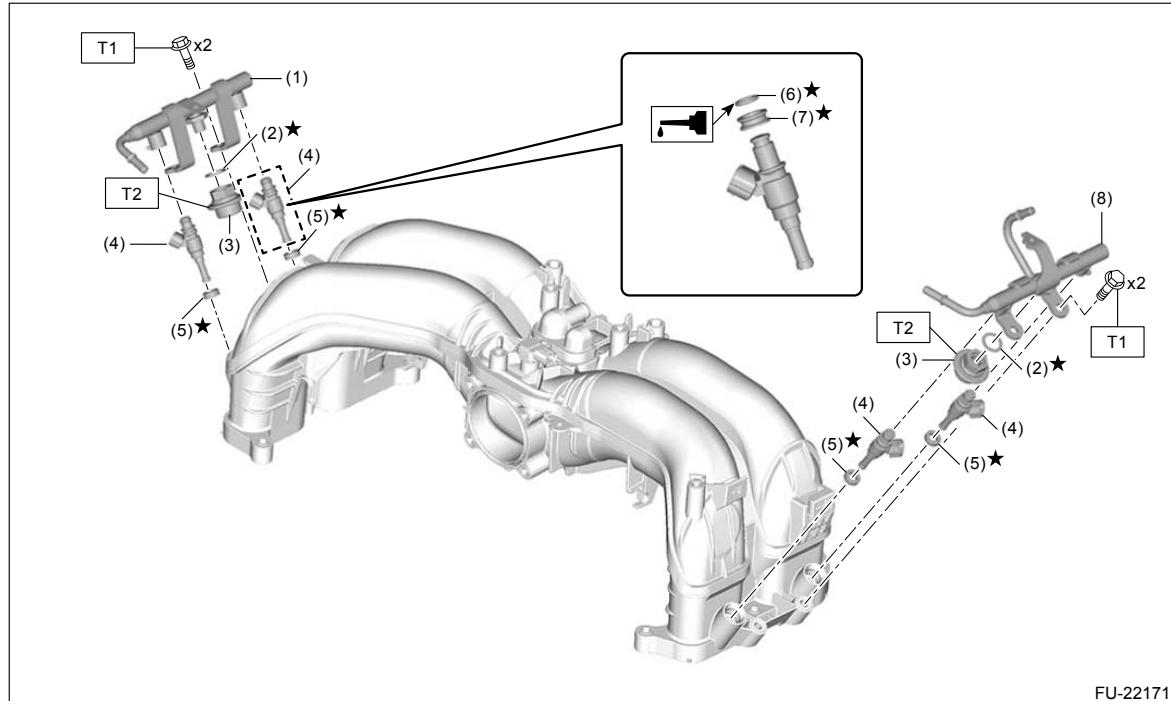
1. INTAKE MANIFOLD ASSEMBLY



FU-22170

- | | | |
|-----------------------------------|---------------------------------------|--|
| (1) Collector cover | (5) Manifold absolute pressure sensor | Tightening torque: N·m (kgf·m, ft-lb) |
| (2) Grommet | (6) O-ring | T1: 3.4 (0.3, 2.5) |
| (3) Collector cover bracket No. 1 | (7) Intake manifold ASSY | T2: 6.4 (0.7, 4.7) |
| (4) Collector cover bracket No. 2 | (8) Gasket | T3: 25 (2.5, 18.4) |

2. FUEL INJECTOR (PORT INJECTION SIDE)



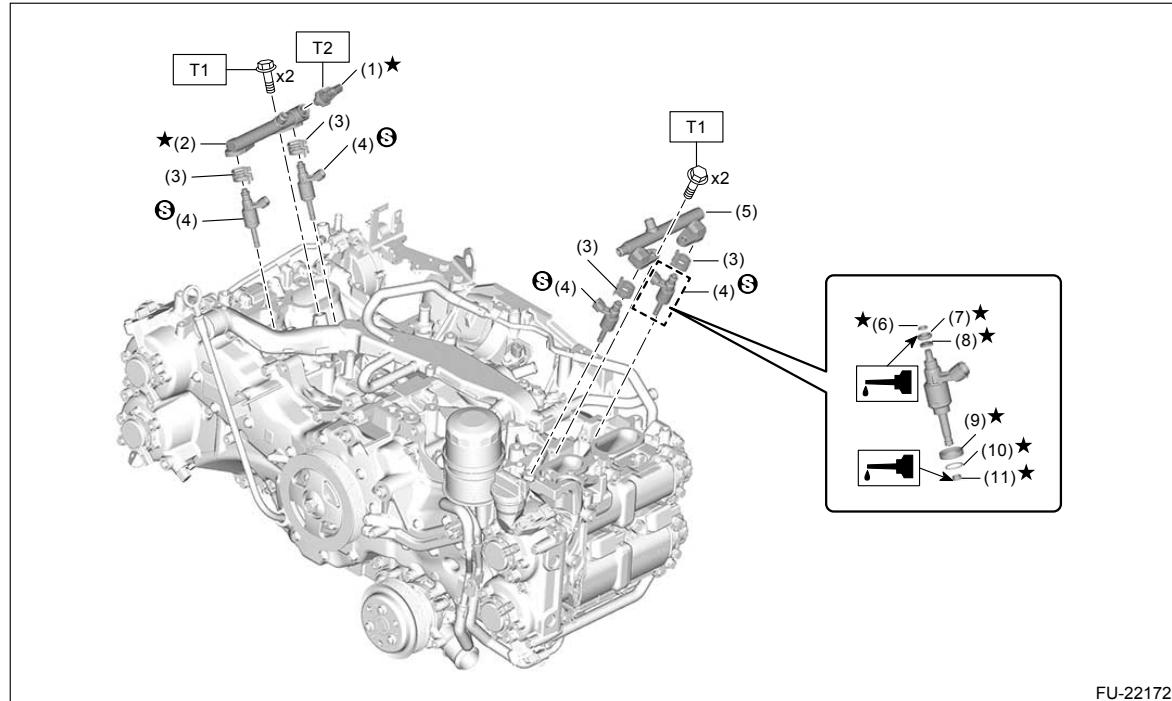
- | | |
|------------------------|------------------|
| (1) Fuel pipe RH | (5) Seal ring |
| (2) Gasket | (6) O-ring |
| (3) Pulsation damper | (7) Rubber |
| (4) Fuel injector ASSY | (8) Fuel pipe LH |

Tightening torque: N·m (kgf·m, ft-lb)

T1: 19 (1.9, 14.0)

T2: 21.6 (2.2, 15.9)

3. FUEL INJECTOR (CYLINDER DIRECT INJECTION SIDE)

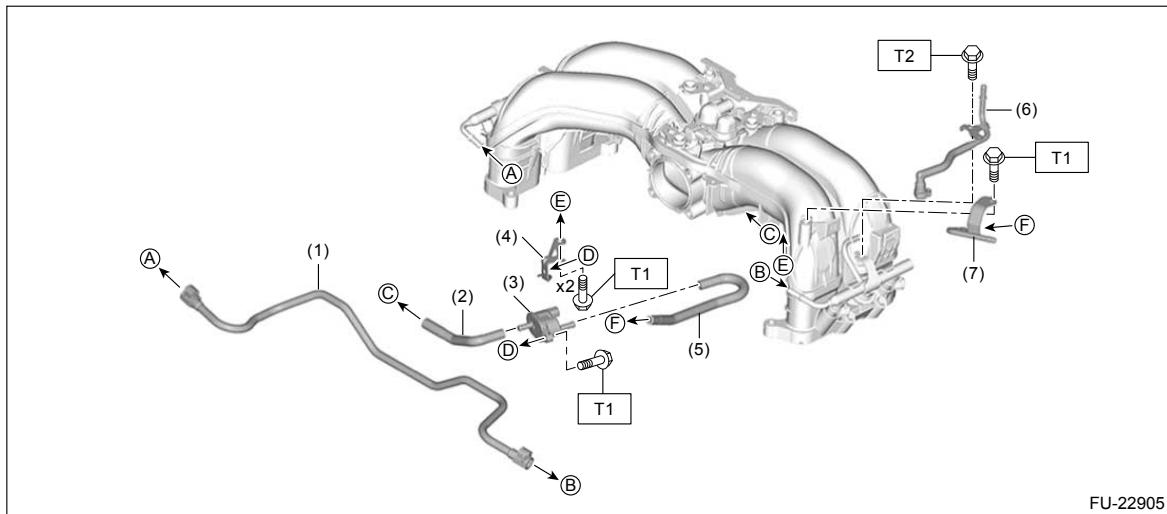


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- | | | |
|----------------------------|-----------------------------|--|
| (1) Fuel pressure sensor | (6) Stopper ring | (11) Fuel injector seal |
| (2) Fuel injector pipe RH* | (7) O-ring seal | |
| (3) Fuel injector holder | (8) Back-up ring | |
| (4) Fuel injector ASSY | (9) Fuel injector insulator | Tightening torque: N·m (kgf-m, ft-lb) |
| (5) Fuel injector pipe LH | (10) Fuel injector ring | T1: 19 (1.9, 14.0)
T2: 46 (4.7, 33.9) |

*: When removing the fuel pressure sensor from the fuel injector pipe RH, replace it with a new one.

4. FUEL PIPE 1



(1) Fuel delivery pipe

(5) Vacuum hose

Tightening torque: N·m (kgf·m, ft-lb)

(2) Vacuum hose

(6) Fuel delivery pipe ASSY

T1: 6.4 (0.7, 4.7)

(3) Purge control solenoid valve

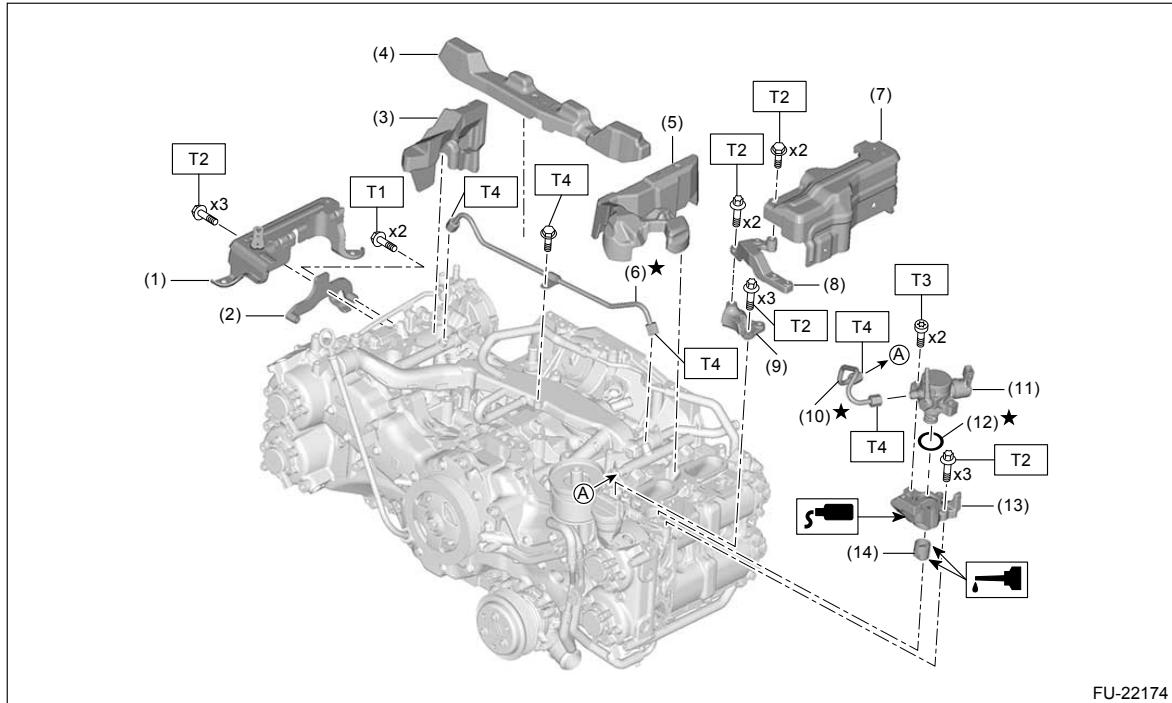
(7) Vacuum pipe

T2: 9 (0.9, 6.6)

(4) Purge control solenoid valve
bracket

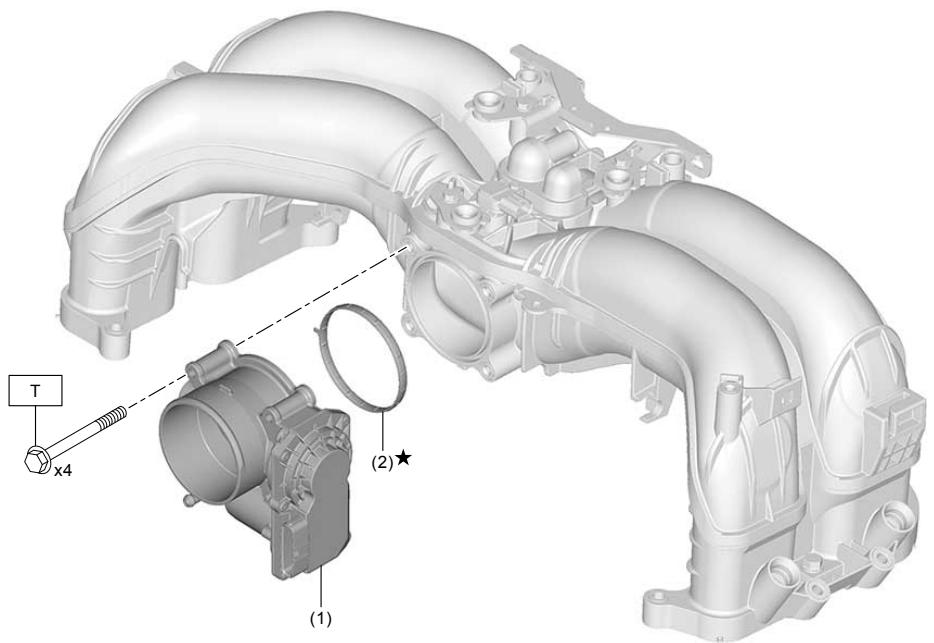
FU-22905

5. FUEL PIPE 2



- | | | |
|---|---------------------------------------|---|
| (1) Fuel pipe protector RH No. 1 | (8) Fuel pipe protector LH No. 2 | Tightening torque: N·m (kgf·m, ft-lb) |
| (2) Fuel pipe protector RH No. 2 | (9) Fuel pipe protector LH No. 3 | T1: 6.4 (0.7, 4.7) |
| (3) Fuel pipe insulator No. 1 | (10) High-pressure fuel delivery pipe | T2: 19 (1.9, 14.0) |
| (4) Fuel pipe insulator No. 2 | (11) High-pressure fuel pump | T3: 21 (2.1, 15.5) |
| (5) Fuel pipe insulator No. 3 | (12) O-ring | T4: Ref. to FUEL SYSTEMS(H4DO)>High Pressure Fuel Delivery Pipe>INSTALLATION. |
| (6) High-pressure fuel delivery pipe ASSY | (13) High-pressure fuel pump case | |
| (7) Fuel pipe protector LH No. 1 | (14) Fuel pump lifter | |

6. THROTTLE BODY



FU-22175

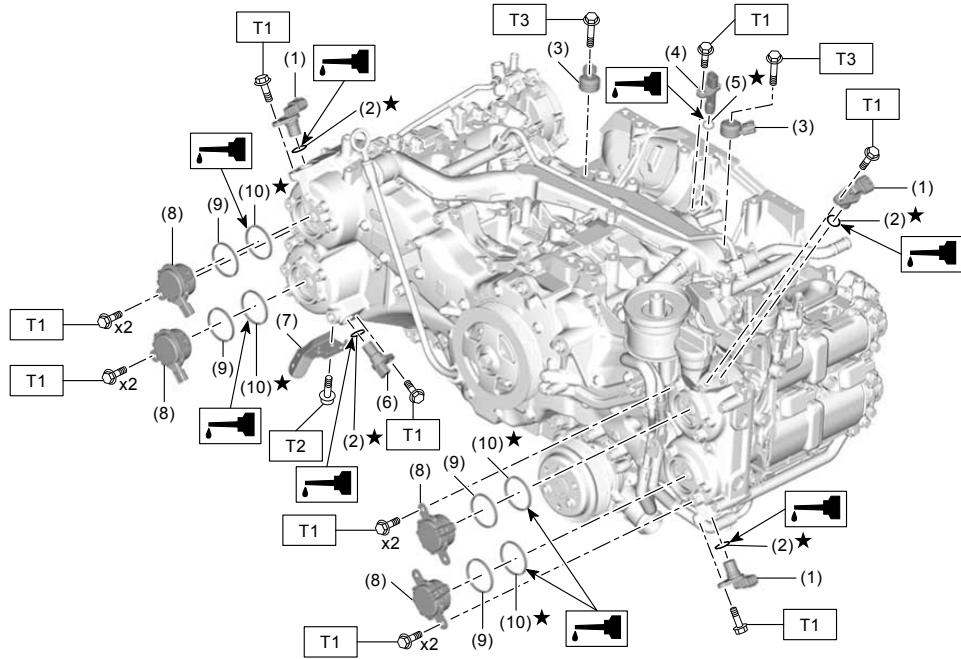
(1) Throttle body

*Tightening torque: N·m (kgf-m,
ft-lb)*

(2) Gasket

T: 8 (0.8, 5.9)

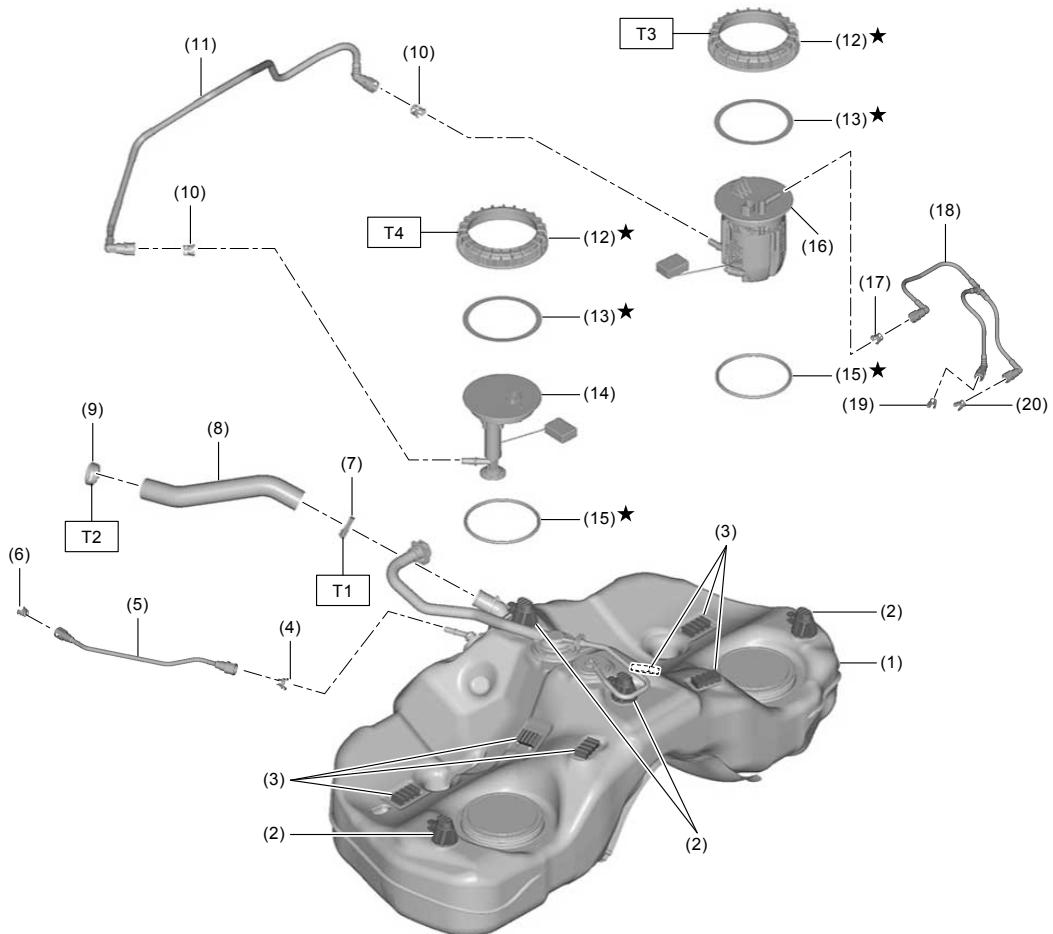
7. CRANKSHAFT POSITION SENSOR, CAMSHAFT POSITION SENSOR, KNOCK SENSOR AND OIL CONTROL SOLENOID



FU-22177

- | | | |
|--------------------------------|--------------------------------|--|
| (1) Camshaft position sensor | (6) Camshaft position sensor | Tightening torque: N·m (kgf-m, ft-lb) |
| (2) O-ring | (7) Rear oxygen sensor bracket | T1: 6.4 (0.7, 4.7) |
| (3) Knock sensor | (8) Oil control solenoid | T2: 9.5 (1.0, 7.0) |
| (4) Crankshaft position sensor | (9) Back-up ring | T3: 24 (2.4, 17.7) |
| (5) O-ring | (10) O-ring | |

8. FUEL TANK 1

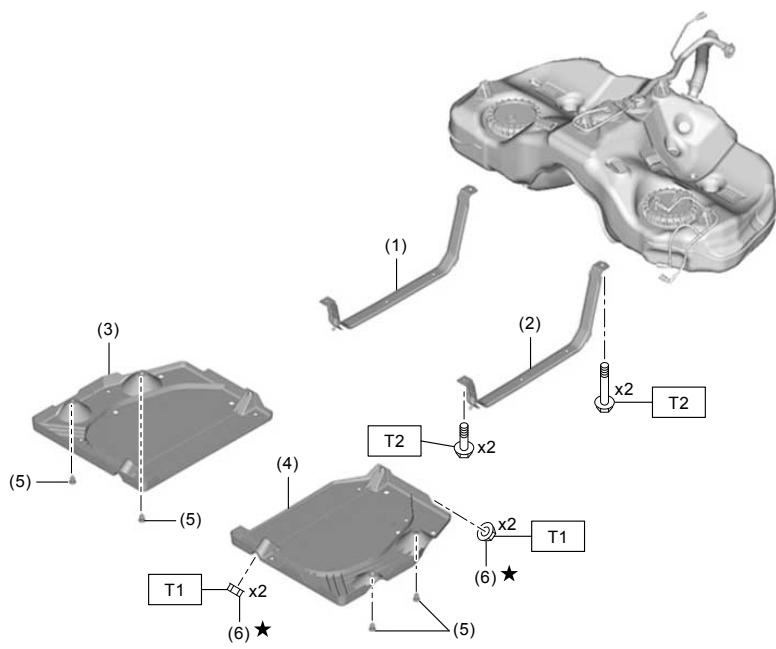


FU-22447

- | | | |
|----------------------|-----------------------------|--|
| (1) Fuel tank | (10) Retainer | (19) Retainer |
| (2) Cushion ASSY | (11) Fuel sub delivery tube | (20) Retainer |
| (3) Cushion * | (12) Ring nut | |
| (4) Retainer | (13) Ring nut plate | Tightening torque: N·m (kgf·m, ft-lb) |
| (5) Circulate tube | (14) Fuel sub level sensor | T1: 2 (0.2, 1.5) |
| (6) Retainer | (15) Gasket | T2: 5 (0.5, 3.7) |
| (7) Clamp | (16) Fuel pump ASSY | T3: Ref. to FUEL INJECTION (FUEL SYSTEMS)(H4DO)>Fuel Pump Assembly>INSTALLATION. |
| (8) Fuel filler hose | (17) Retainer | T4: Ref. to FUEL INJECTION (FUEL SYSTEMS)(H4DO)>Fuel Sub Level Sensor>INSTALLATION. |
| (9) Clamp | (18) Fuel delivery tube | |

*: When removing from the fuel tank, replace it with a new part.

9. FUEL TANK 2



FU-22108

- (1) Fuel tank band RH
- (2) Fuel tank band LH
- (3) Fuel tank protector RH

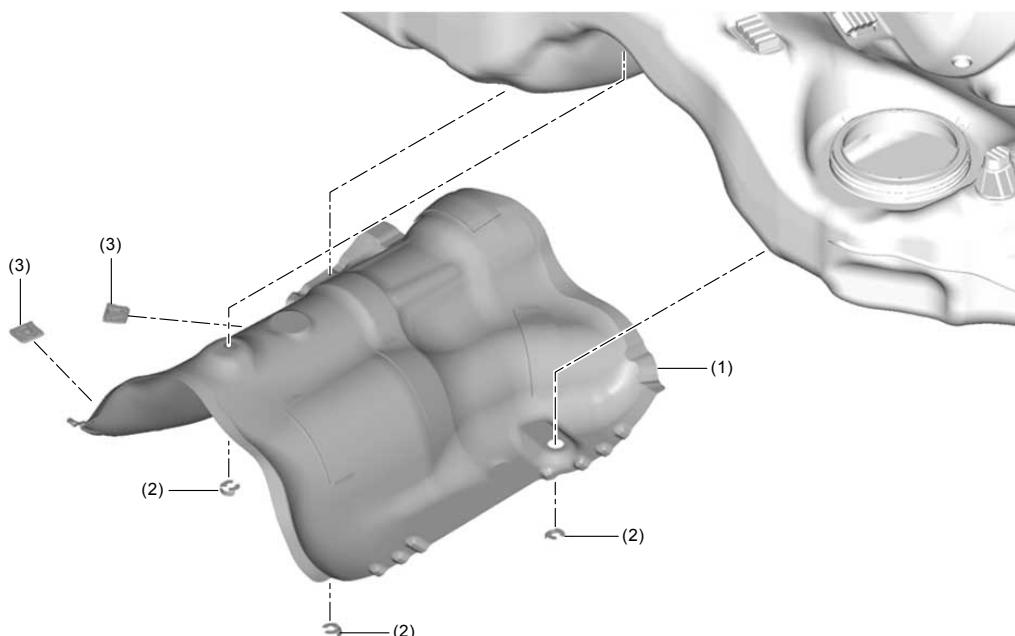
- (4) Fuel tank protector LH
- (5) Clip
- (6) Self-locking nut

Tightening torque: N·m (kgf-m, ft-lb)

T1: 9 (0.9, 6.6)

T2: [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Tank>INSTALLATION.](#)

10. FUEL TANK 3



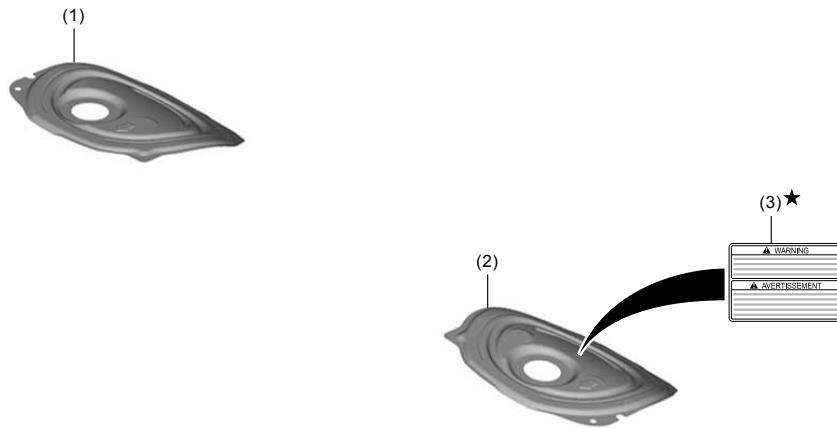
FU-22203

- (1) Fuel tank cover

- (2) Cover clamp

- (3) Cushion cover

11. FUEL TANK 4



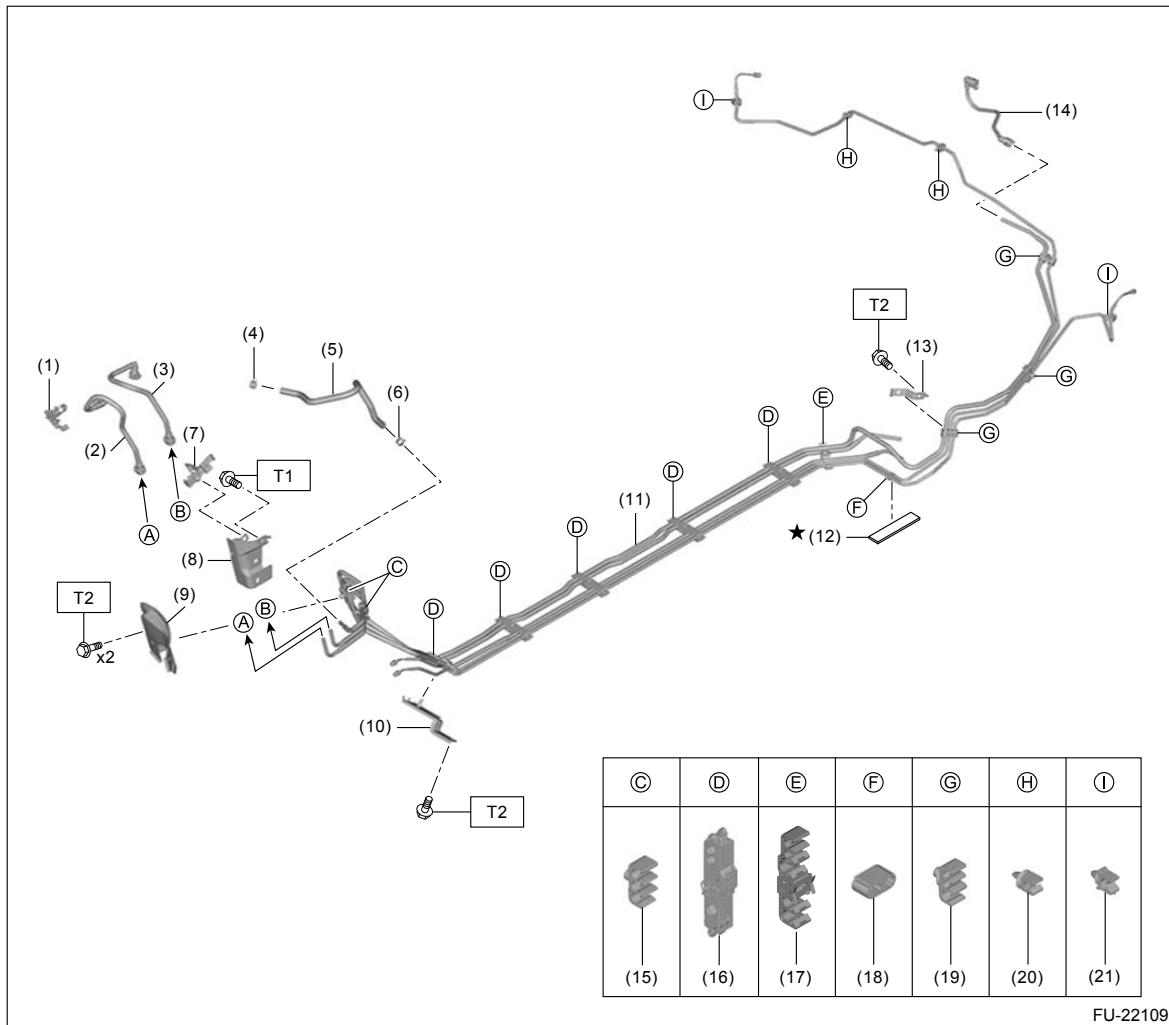
FU-22508

(1) Service hole cover RH

(2) Service hole cover LH

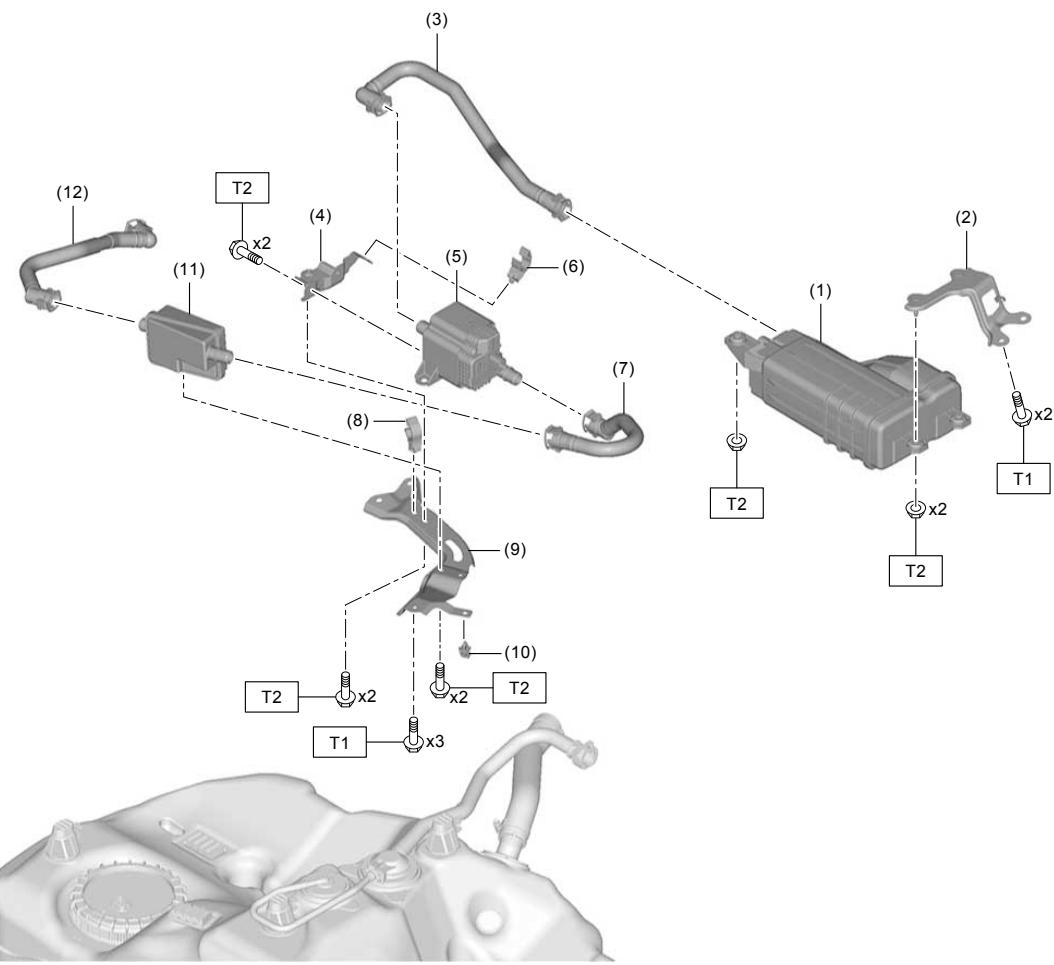
(3) Label

12. FUEL LINE 1



- | | | |
|---|------------------------------|--|
| (1) Fuel delivery tube clamp | (10) Fuel pipe bracket front | (19) Pipe clamp |
| (2) Fuel delivery tube (port injection side) | (11) Fuel pipe ASSY | (20) Pipe clamp |
| (3) Fuel delivery tube (cylinder direct injection side) | (12) Cushion | (21) Pipe clamp |
| (4) Clip | (13) Fuel pipe bracket rear | |
| (5) Evaporation hose | (14) Purge tube | Tightening torque: N·m (kgf-m, ft-lb) |
| (6) Clip | (15) Pipe clamp | T1: 7.5 (0.8, 5.5) |
| (7) Fuel delivery tube clamp | (16) Pipe clamp | T2: 18 (1.8, 13.3) |
| (8) Fuel protector | (17) Pipe clamp | |
| (9) Pipe protector | (18) Pipe clamp | |

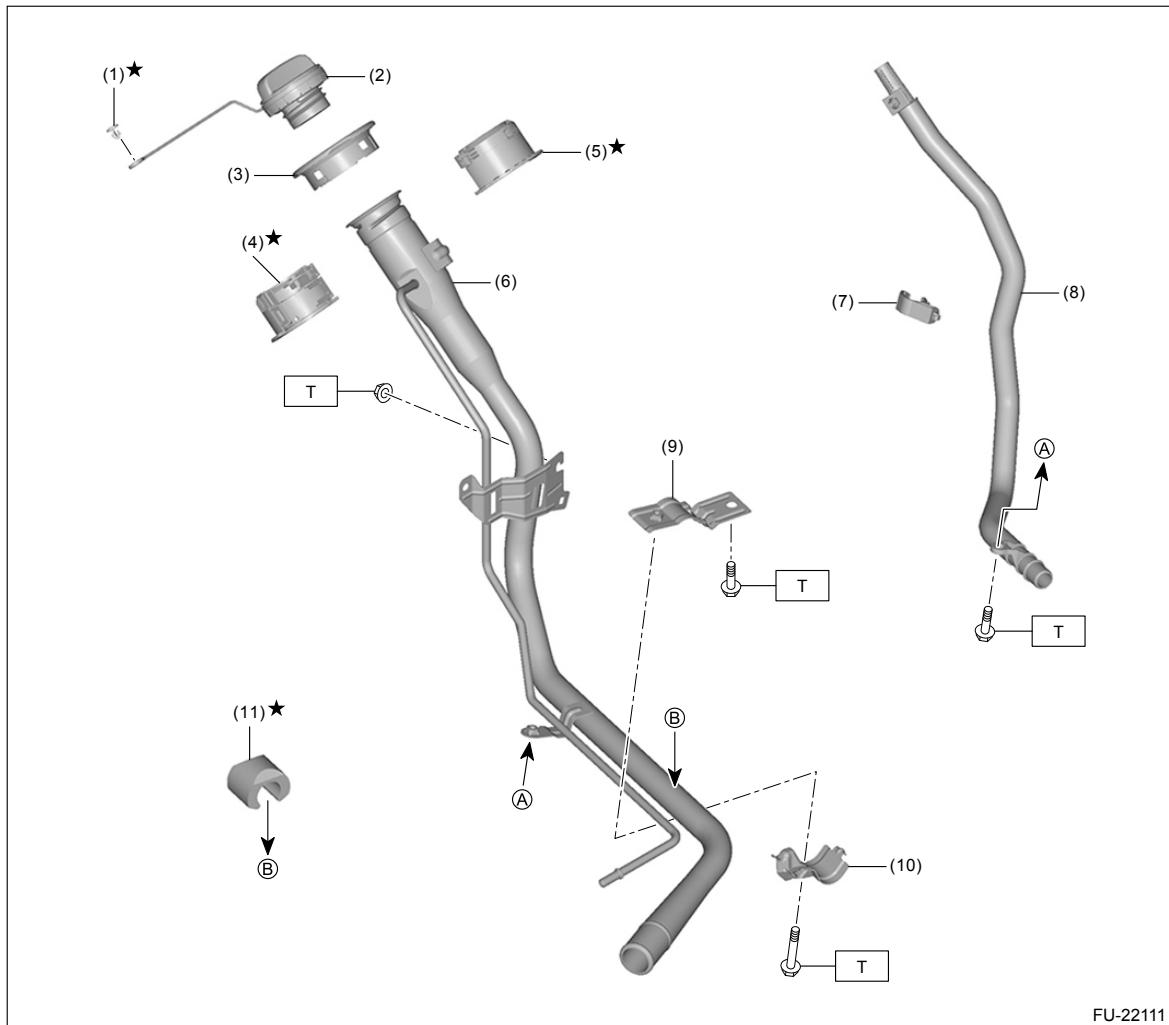
13. FUEL LINE 2



FU-22110

- | | | |
|-----------------------------------|-------------------|--|
| (1) Canister | (7) Drain tube | Tightening torque: N·m (kgf·m, ft-lb) |
| (2) Canister bracket | (8) Tube clamp | T1: 7.5 (0.8, 5.5) |
| (3) Drain tube | (9) Bracket | T2: 8 (0.8, 5.9) |
| (4) Leak check valve ASSY bracket | (10) Tube clamp | |
| (5) Leak check valve ASSY | (11) Drain filter | |
| (6) Tube clamp | (12) Drain tube | |

14. FUEL FILLER CAP AND FUEL FILLER PIPE

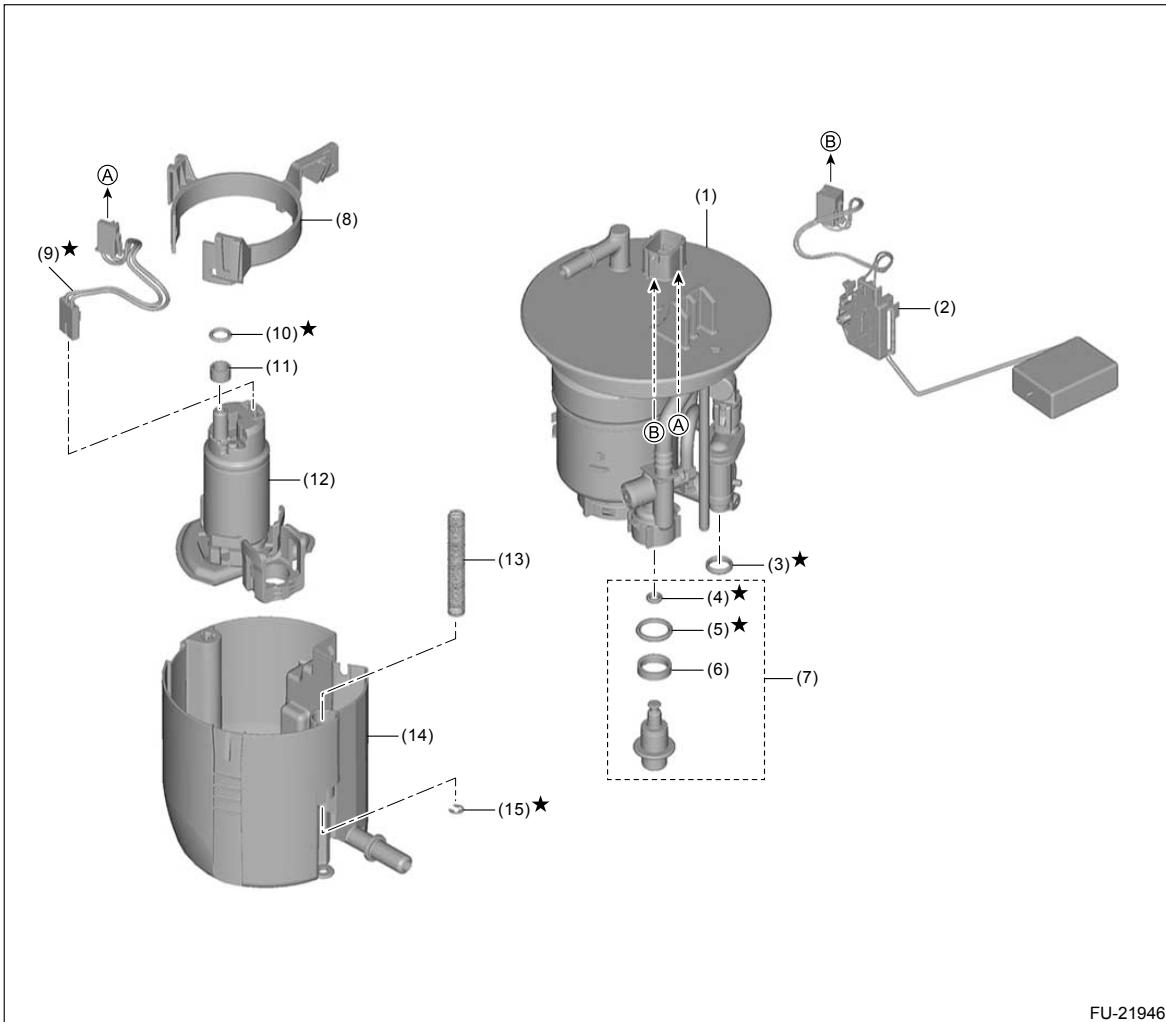


- | | | |
|--------------------------------|----------------------|--|
| (1) Clip | (6) Fuel filler pipe | (11) Cushion |
| (2) Fuel filler cap | (7) Tube clamp | |
| (3) Fuel filler pipe protector | (8) Drain tube | Tightening torque: N·m (kgf·m, ft-lb) |
| (4) Neck holder A | (9) Upper bracket | T: 7.5 (0.8, 5.5) |
| (5) Neck holder B | (10) Lower bracket | |

15. FUEL LID

For the fuel lid components, refer to the "SECURITY AND LOCKS". [Ref. to SECURITY AND LOCKS>General Description>COMPONENT.](#)

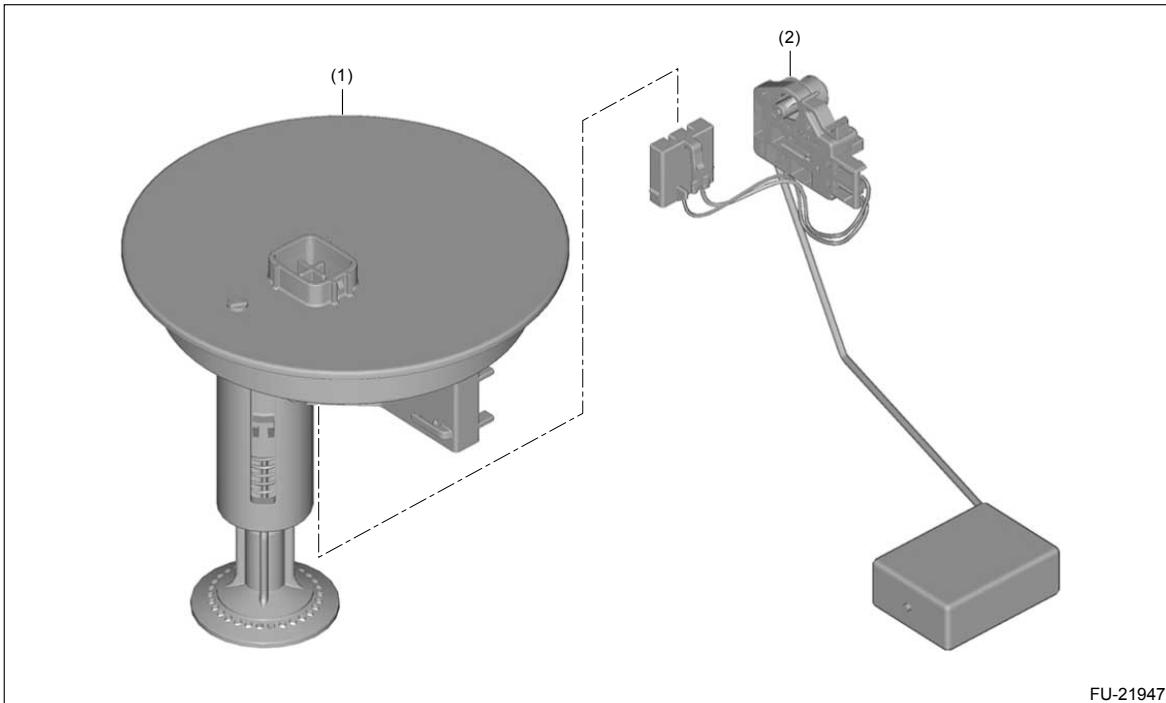
16. FUEL PUMP



FU-21946

- | | | |
|-----------------------|------------------------|------------------------|
| (1) Fuel filter ASSY | (6) Back-up ring | (11) Spacer |
| (2) Fuel level sensor | (7) Pressure regulator | (12) Fuel pump |
| (3) O-ring | (8) Fuel pump holder | (13) Spring |
| (4) O-ring | (9) Connector cable | (14) Fuel chamber ASSY |
| (5) O-ring | (10) O-ring | (15) Clip |

17. FUEL SUB LEVEL SENSOR

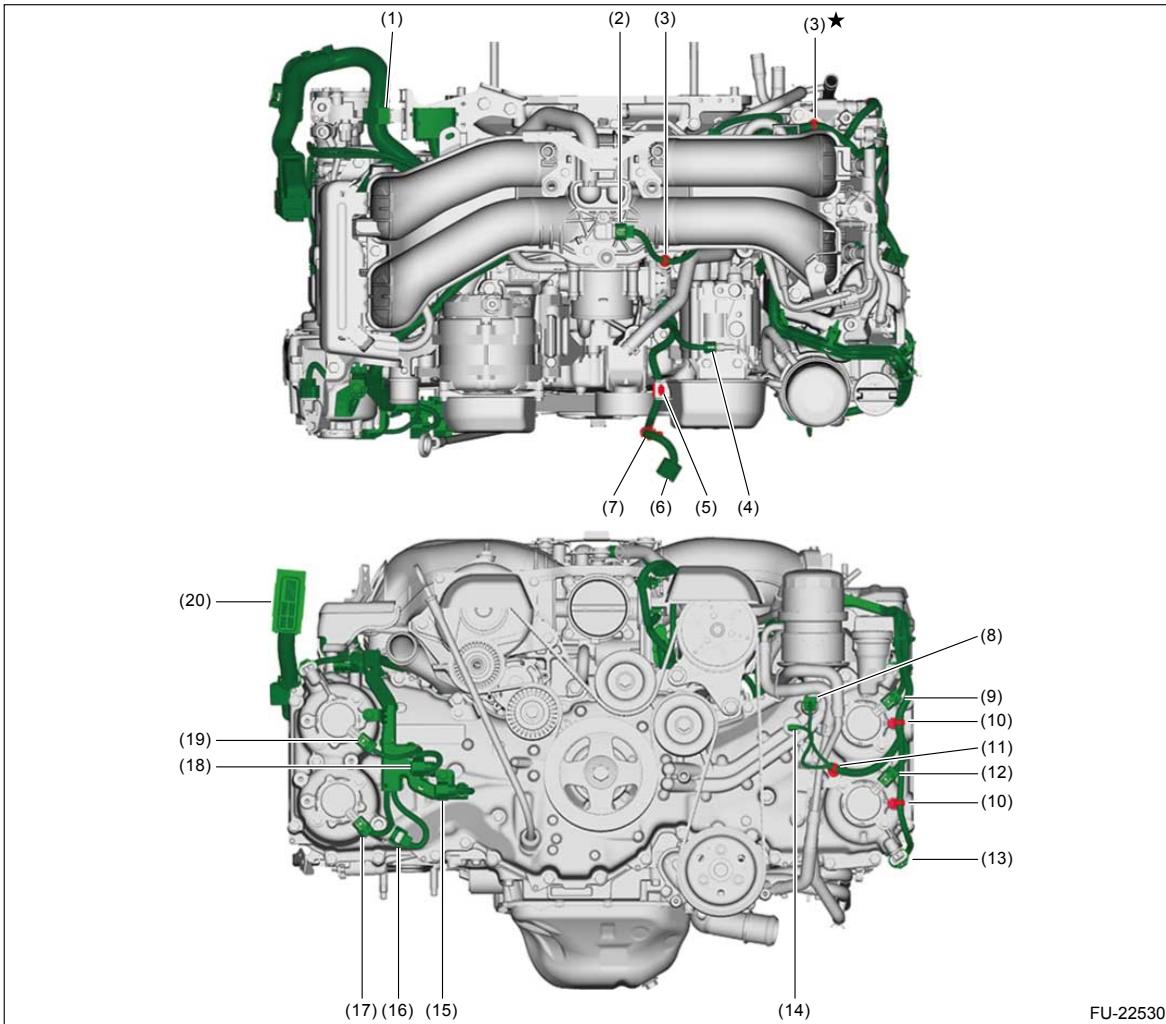


FU-21947

(1) Fuel sub level sensor case (2) Fuel sub level sensor

18. ENGINE WIRING HARNESS

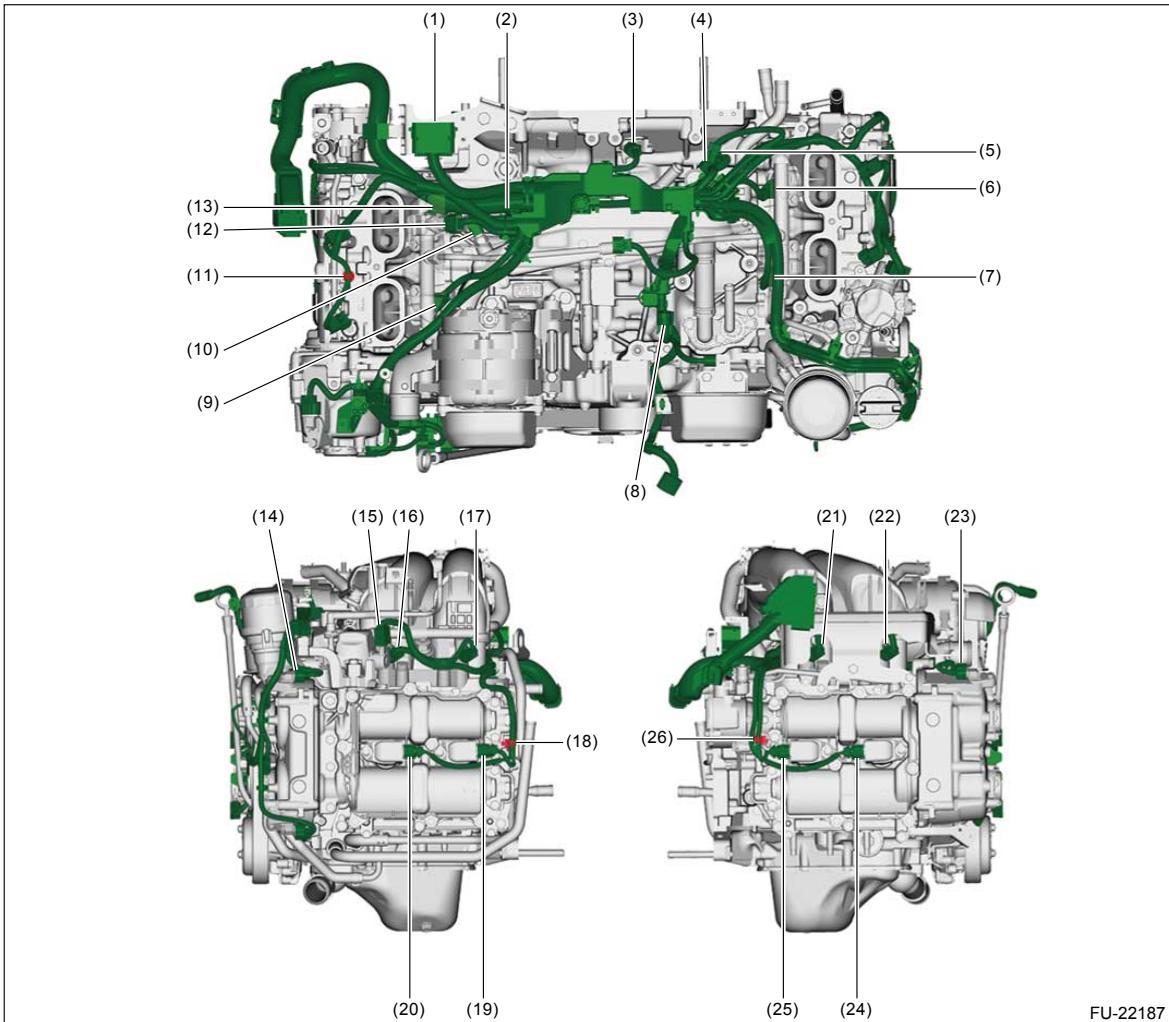
- Structural diagram 1



FU-22530

- (1) Secure to the engine rear hanger with the clip.
- (2) Manifold absolute pressure sensor connector
- (3) Secure to the intake manifold assembly with the clip.
- (4) Magnet switch connector
- (5) Secure to the V-belt cover with the clip.
- (6) Mass air flow and intake air temperature sensor
- (7) Secure to the air cleaner case with the clip.
- (8) Engine oil temperature sensor connector
- (9) Intake oil control solenoid connector LH
- (10) Secure to the chain cover with the clip.
- (11) Secure to the oil cooler pipe with the clip.
- (12) Exhaust oil control solenoid connector LH
- (13) Exhaust camshaft position sensor connector LH
- (14) Oil pressure switch connector
- (15) Front oxygen (A/F) sensor connector
- (16) Exhaust camshaft position sensor connector RH
- (17) Exhaust oil control solenoid connector RH
- (18) Rear oxygen sensor connector
- (19) Intake oil control solenoid connector RH
- (20) ECM connector (for installation and removal, refer to "Engine Control Module (ECM)". [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Engine Control Module \(ECM\).](#)

- Structural diagram 2

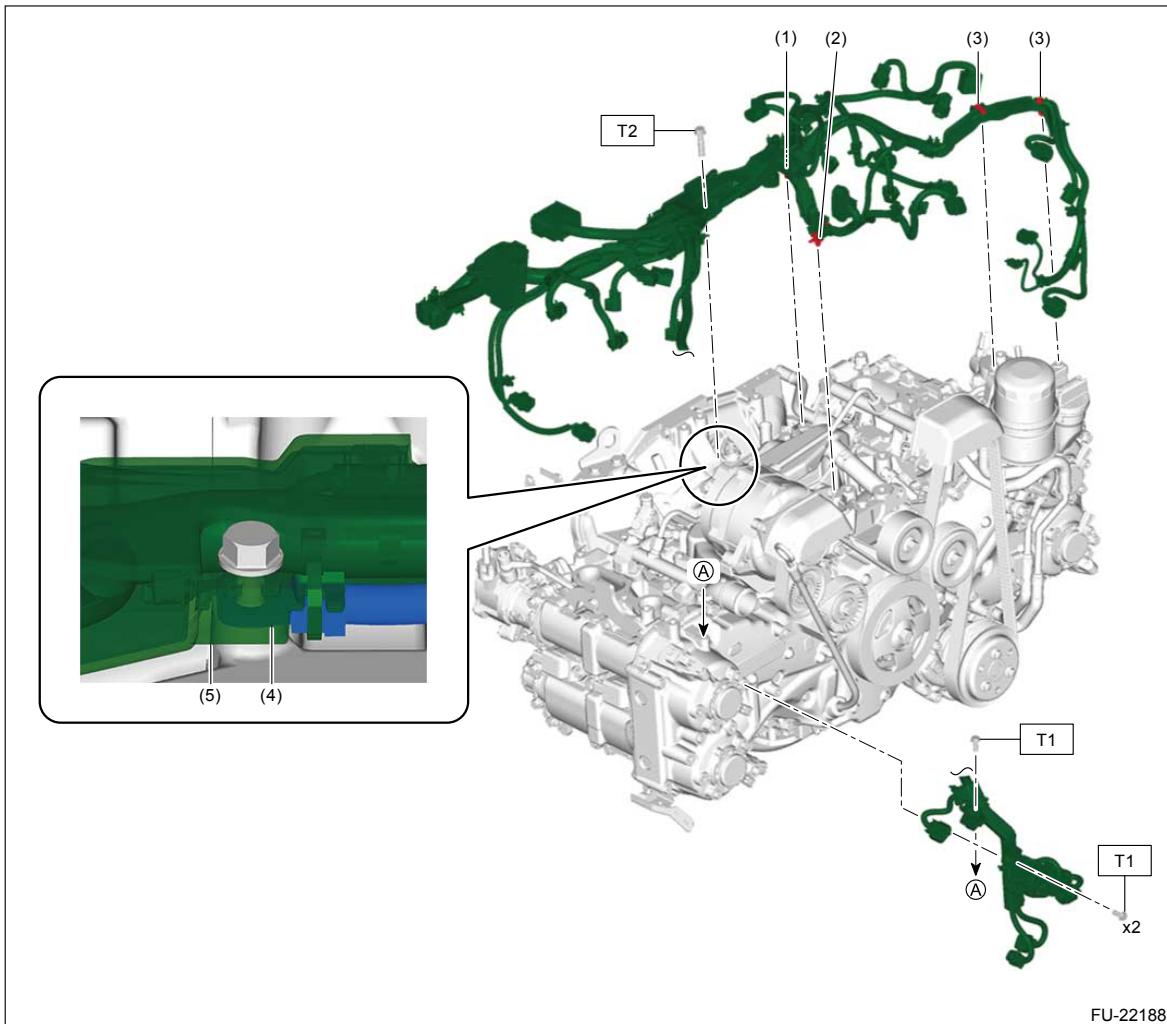


FU-22187

- (1) Transmission harness connector (Securely install to the engine rear hanger.)
- (2) Knock sensor connector RH
- (3) Crankshaft position sensor connector
- (4) Knock sensor connector LH
- (5) Purge control solenoid valve connector
- (6) Fuel injector connector (cylinder direct injection side #4)
- (7) Fuel injector connector (cylinder direct injection side #2)
- (8) Throttle position sensor connector
- (9) Fuel injector connector (cylinder direct injection side #1)
- (10) Engine coolant temperature sensor connector
- (11) Secure to the fuel pipe with the clip.
- (12) Fuel pressure sensor connector
- (13) Fuel injector connector (cylinder direct injection side #3)
- (14) Intake camshaft position sensor connector LH
- (15) High-pressure fuel pump connector
- (16) Fuel injector connector (port injection side #2)
- (17) Fuel injector connector (port injection side #4)
- (18) Secure to the cam carrier with the clip.
- (19) Ignition coil connector (#4)
- (20) Ignition coil connector (#2)
- (21) Fuel injector connector (port injection side #3)
- (22) Fuel injector connector (port injection side #1)

- (23) Intake camshaft position sensor connector RH
- (24) Ignition coil connector (#1)
- (25) Ignition coil connector (#3)
- (26) Secure to the camshaft cap with the clip.

- Structural diagram 3



- (1) Secure to the water tank pipe ASSY with the clip.
- (2) Secure to the cylinder block with the clip.
- (3) Secure to the fuel pipe protector with the clip.
- (4) Engine ground (fastened together with harness case)
- (5) Harness case

Tightening torque: N·m (kgf-m, ft-lb)

T1: 6.4 (0.7, 4.7)

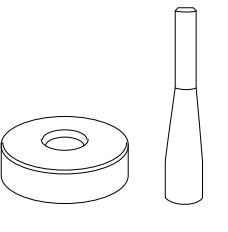
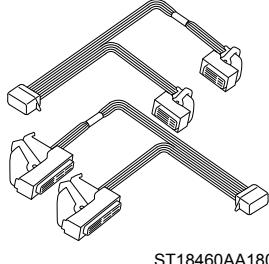
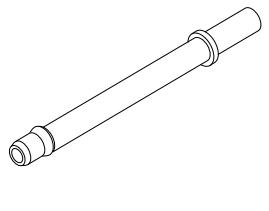
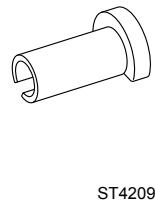
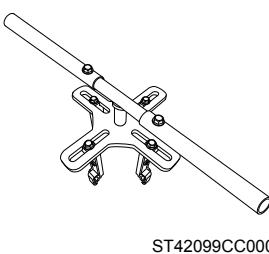
T2: 19 (1.9, 14.0)

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > General Description

PREPARATION TOOL

1. SUBARU SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
	<u>09260-39020</u>	Injector Tool Set	Used for installing the fuel injector seal.

 ST0926039020			
 ST18460AA180	18460AA180	CHECK BOARD	Used for measuring voltage and resistance of ECM terminals.
 ST18471AA000	18471AA000	FUEL PIPE ADAPTER	Used for draining fuel.
 ST42099AE000	42099AE000	QUICK CONNECTOR RELEASE	Used for removing the quick connector on the fuel hose.
 ST42099CC000	42099CC000	ST FUEL PUMP	Used for removing and installing fuel pump and fuel sub level sensor.
	—	SUBARU SELECT MONITOR 4	Used for setting of each function and troubleshooting for electrical system.



STSSM4

Note:

- For detailed operation procedures, refer to "Help" of application.
- Used together with interface for Subaru Select Monitor (such as DST-i and DST-010).

2. OTHER

	REMARKS
TORX® E10	Used for removing and installing fuel pipe protector LH No. 3 and high-pressure fuel pump case.
TORX® E12	Used for removing and installing fuel pipe protector LH No. 2.
TORX PLUS® 40IP	Used for removing and installing high-pressure fuel pump.
Circuit tester	Used for measuring resistance, voltage and current.
Oscilloscope	Used for inspecting the waveform of each sensor.
Mighty Vac	Used for inspecting the manifold absolute pressure sensor.

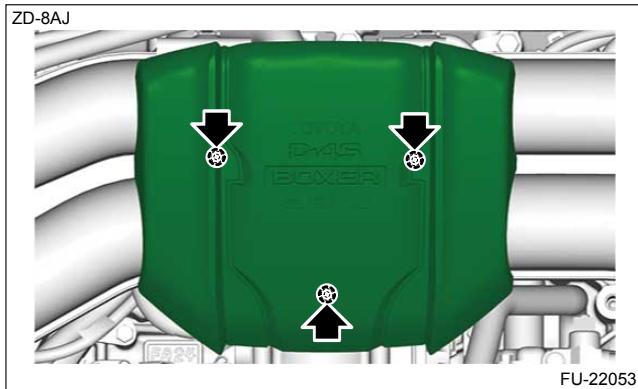
FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Collector Cover

REMOVAL

1. Remove the collector cover.

Note:

Check the grommet for peel-off or disengagement.



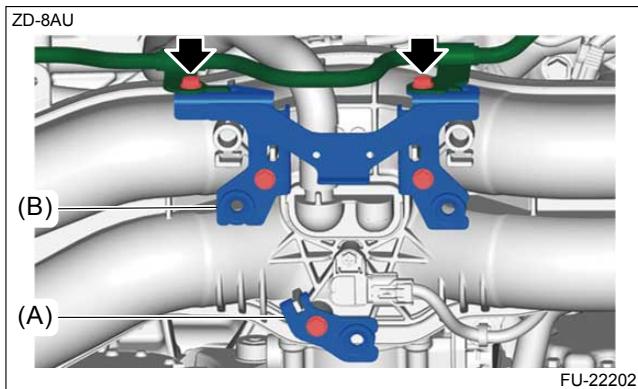
2. Remove the collector cover bracket.

Note:

Perform this procedure only when required.

(1) Remove the bolts securing the brake vacuum pipe.

(2) Remove the collector cover bracket No. 1 (A) and collector cover bracket No. 2 (B).



FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Collector Cover

INSTALLATION

1. Install the collector cover bracket No. 1 and collector cover bracket No. 2.

Tightening torque:

6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

2. Secure the brake vacuum pipe with the bolts.

Tightening torque:

7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

3. Install the collector cover.

Note:

Check the grommet for peel-off or disengagement.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Collector Cover

INSPECTION

Check that the collector cover does not have deformation, cracks and any other damage.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Throttle Body

REMOVAL



1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Drain engine coolant. [Ref. to COOLING\(H4DO\)>Engine Coolant>REPLACEMENT > DRAINING OF ENGINE COOLANT.](#)
3. Perform the steps below to remove the air intake boot, and place it aside so that it does not interfere with the work.

Caution:

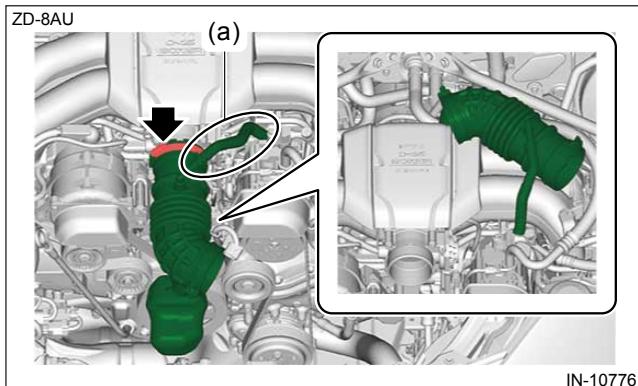
Do not disconnect the PCV hose No. 2 (a).

(1) Remove the air cleaner case. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Cleaner Case>REMOVAL.](#)

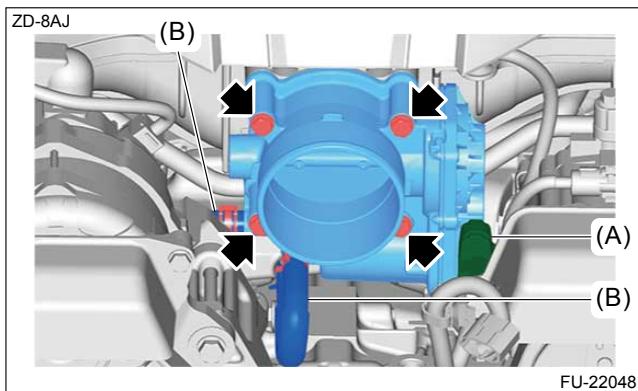
(2) Loosen the clamp, remove the air intake boot, and place it aside so that it does not interfere with the work.

Caution:

Be careful not to pull out the PCV hose No. 2 (a).



4. Disconnect the connector (A) and preheater hose (B).
5. Remove the throttle body.



FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Throttle Body

INSTALLATION

1. Place a new gasket and install the throttle body.

Tightening torque:

8 N·m (0.8 kgf-m, 5.9 ft-lb)

2. Connect the connector and preheater hose.
3. Install the air intake boot. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Intake Boot>INSTALLATION.](#)
4. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
5. Fill engine coolant. [Ref. to COOLING\(H4DO\)>Engine Coolant>REPLACEMENT > FILLING OF ENGINE COOLANT.](#)

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Throttle Body

INSPECTION

1. THROTTLE SENSOR (METHOD WITH CIRCUIT TESTER)

Note:

Individual difference of the accelerator pedal may not be corrected sufficiently on the ECM side after the memory was cleared or the battery was removed and installed on the vehicle. Therefore, when the reference voltage is not reached after following the procedure, repeat the ignition switch ON (engine OFF) and ignition switch OFF operations 40 times at intervals of three seconds or more, and then measure the voltage again.

1. Disconnect the ground terminal from battery sensor. Ref. to REPAIR CONTENTS>NOTE > BATTERY.
2. Disconnect the connector from ECM. Ref. to FUEL INJECTION (FUEL SYSTEMS)(H4DO)>Engine Control Module (ECM)>REMOVAL.
3. Attach the ST between the ECM, engine wiring harness and the bulkhead wiring harness. Ref. to ENGINE (DIAGNOSTICS) (H4DO)>General Description>PREPARATION TOOL > HOW TO USE CHECK BOARD.

Special tool:

CHECK BOARD (18460AA180)

4. Connect the ground terminal to battery sensor. Ref. to REPAIR CONTENTS>NOTE > BATTERY.
5. Turn the ignition switch to ON. (Engine OFF)
6. Measure the voltage between ECM connector terminals.

1	2	3	4	5	6	7	8	9	10	11	12	13
14	15	16	17	18	19	20	21	22	23	24	25	26
27	28	29	30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49	50	51	52
53	54	55	56	57	58	59	60	61	62	63	64	65
66	67	68	69	70	71	72	73	74	75	76	77	78
79	80	81	82	83	84	85	86	87	88	89	90	91
92	93	94	95	96	97	98	99	100	101	102	103	104
105	106	107	108	109	110	111	112	113	114			

FU-20888

Throttle sensor	Accelerator pedal	Terminal No.	Standard
Main	Not depressed (full closed)	29 (+) – 30 (-)	Approx. 0.6 – 1.2 V
	Depressed (full opened)		Approx. 3.8 – 4.4 V
Sub	Not depressed (full closed)	43 (+) – 30 (-)	Approx. 1.4 – 2.0 V
	Depressed (full opened)		Approx. 4.0 – 4.6 V

7. After inspection, install the related parts in the reverse order of removal.

Note:

For installation procedures of ECM connectors, refer to Engine Control Module (ECM). Ref. to FUEL INJECTION (FUEL SYSTEMS)(H4DO)>Engine Control Module (ECM)>INSTALLATION.

2. THROTTLE SENSOR (METHOD WITH SUBARU SELECT MONITOR)

Note:

- Individual difference of the accelerator pedal may not be corrected sufficiently on the ECM side after the memory was cleared or the battery was removed and installed on the vehicle. Therefore, using the Subaru Select Monitor, check that the accelerator opening angle signal indicates [100%], when the accelerator pedal is fully depressed, and then perform the inspection.
- If the accelerator opening angle signal does not indicate [100%], check the accelerator pedal.  [Ref. to SPEED CONTROL SYSTEMS\(H4DO\)>Accelerator Pedal>INSPECTION.](#)

1. Turn the ignition switch to ON. (Engine OFF)
2. While reading the accelerator opening angle signal and throttle sensor voltage using Subaru Select Monitor, depress the accelerator pedal to fully open and fully closed.  [Ref. to ENGINE \(DIAGNOSTICS\)\(H4DO\)>Data Monitor.](#)

Throttle sensor	Accelerator pedal	Acceleration opening angle signal	Standard
Main	Not depressed (full closed)	0.0 %	Approx. 0.6 — 1.2 V
	Depressed (full opened)	100.0 %	Approx. 3.8 — 4.4 V
Sub	Not depressed (full closed)	0.0 %	Approx. 1.4 — 2.0 V
	Depressed (full opened)	100.0 %	Approx. 4.0 — 4.6 V

3. OTHER INSPECTIONS

1. Check that the throttle body has no deformation, cracks or other damages.
2. Check that the preheater hose has no cracks, damage or loose part.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Intake Manifold Assembly

REMOVAL



1. Release the fuel pressure. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel>PROCEDURE > RELEASING OF FUEL PRESSURE.](#)

2. Open the fuel filler lid and remove the fuel filler cap.

Note:

This operation is required to release the inner pressure of the fuel tank.

3. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

4. Perform the steps below to remove the air intake boot, and place it aside so that it does not interfere with the work.

Caution:

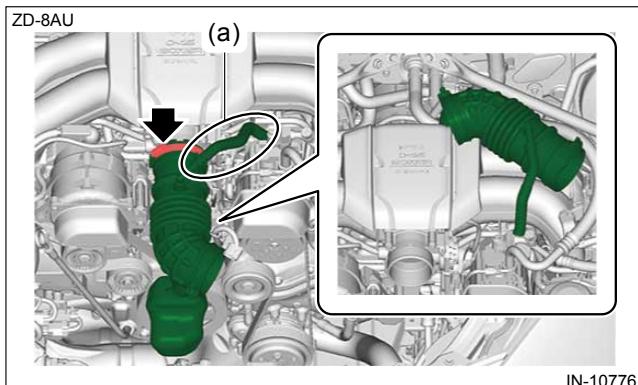
Do not disconnect the PCV hose No. 2 (a).

(1) Remove the air cleaner case. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Cleaner Case>REMOVAL.](#)

(2) Loosen the clamp, remove the air intake boot, and place it aside so that it does not interfere with the work.

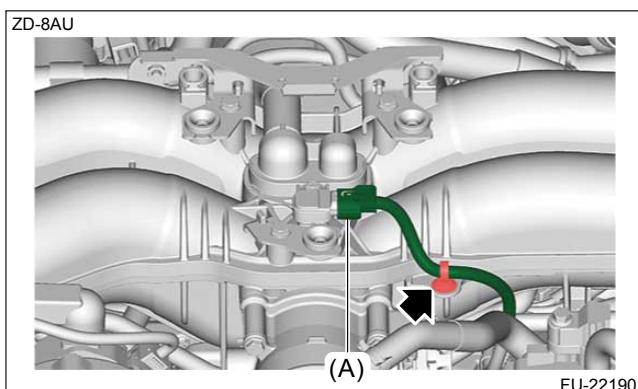
Caution:

Be careful not to pull out the PCV hose No. 2 (a).



5. Remove the PCV hose No. 1. [Ref. to EMISSION CONTROL \(AUX. EMISSION CONTROL DEVICES\)\(H4DO\)>PCV Hose>REMOVAL > PCV HOSE NO. 1.](#)

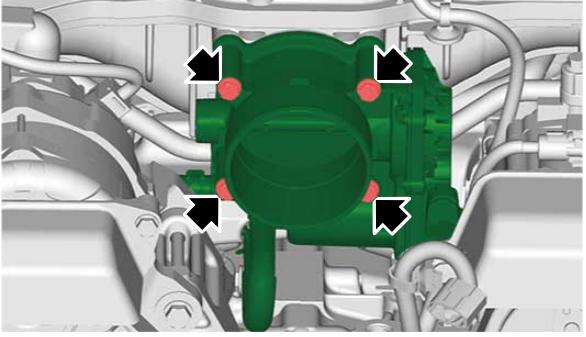
6. Disconnect the connector (A) from manifold absolute pressure sensor and remove the clip.



7. When the engine coolant remains before removing the intake manifold assembly

(1) Remove the bolts securing the throttle body, and move the throttle body aside so that it does not interfere with the work.

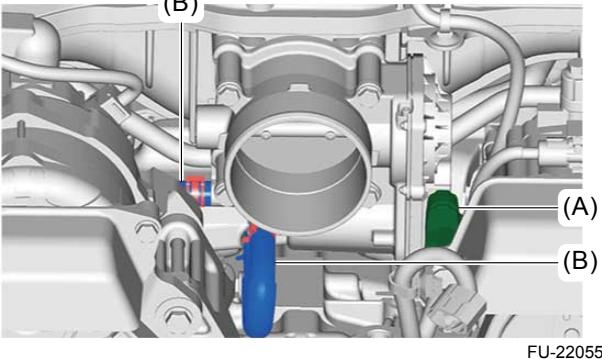
ZD-8AJ



8. When the engine coolant has been drained before removing the intake manifold assembly

(1) Disconnect the connector (A) from the throttle body, and disconnect the preheater hose (B).

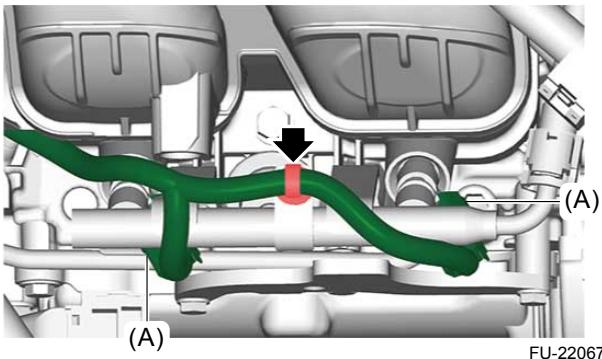
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9. Remove the fuel pipe protector RH No. 1. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Pipe Protector>REMOVAL>FUEL PIPE PROTECTOR RH > FUEL PIPE PROTECTOR RH NO. 1.](#)

10. Disconnect the connector (A) from the fuel injector (port injection side) RH and remove the clip.

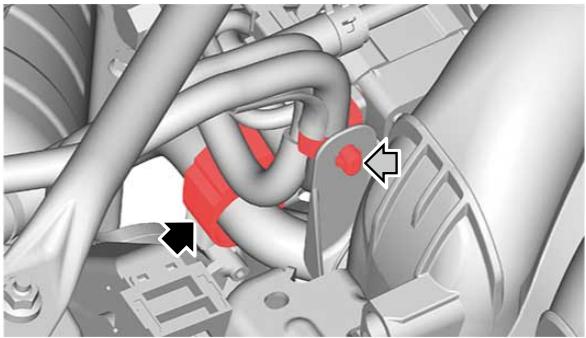
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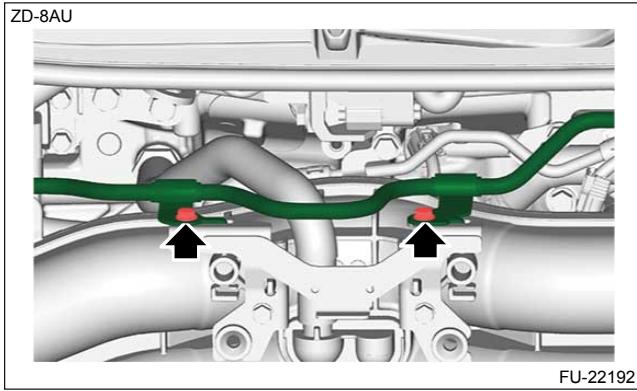
11. Remove the engine wiring harness from the engine rear hanger.

12. Remove clip securing the battery cable assembly.

ZD-8AU

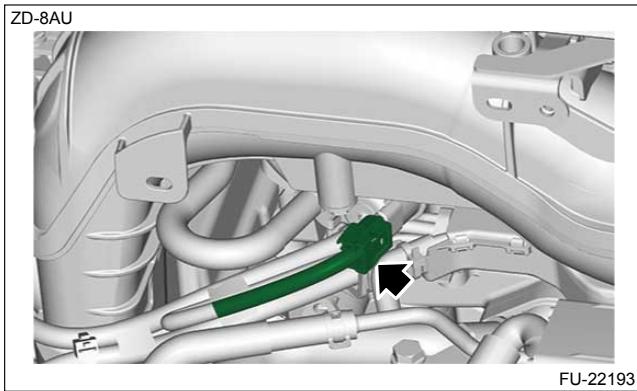


13. Remove the bolt securing the brake vacuum pipe, and place it aside so that it does not interfere with the work.



14. Remove the fuel pipe protector LH No. 1. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Pipe Protector>REMOVAL>FUEL PIPE PROTECTOR LH>FUEL PIPE PROTECTOR LH NO. 1.](#)

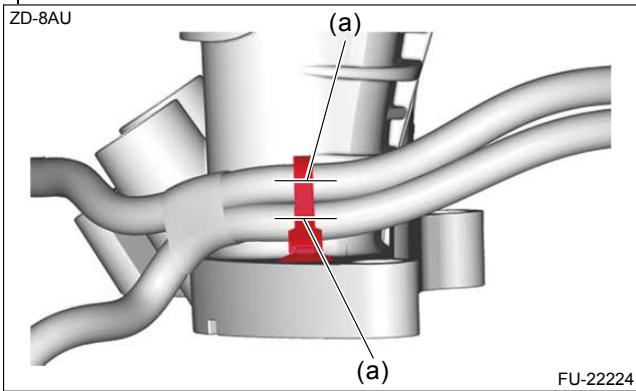
15. Disconnect the connector from the purge control solenoid valve.



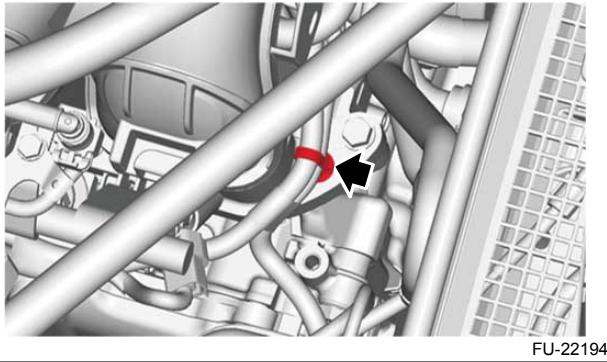
16. Use a pair of nippers to cut off the clip securing the engine wiring harness, and remove the clip from the intake manifold assembly.

Note:

Put alignment marks (a) on the clip and the engine wiring harness.



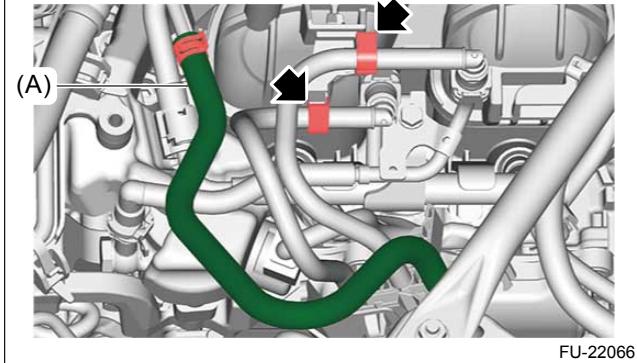
ZD-8AU



17. Disconnect the evaporation hose (A).

18. Open the claw on the fuel delivery tube clamp.

ZD-8AJ



19. Disconnect the fuel delivery tube (cylinder direct injection side) (A). [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>REMOVAL > QUICK CONNECTOR DISCONNECTION \(TYPE A\).](#)

20. Disconnect the fuel delivery tube (port injection side) (B). [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>REMOVAL > QUICK CONNECTOR DISCONNECTION \(TYPE A\).](#)

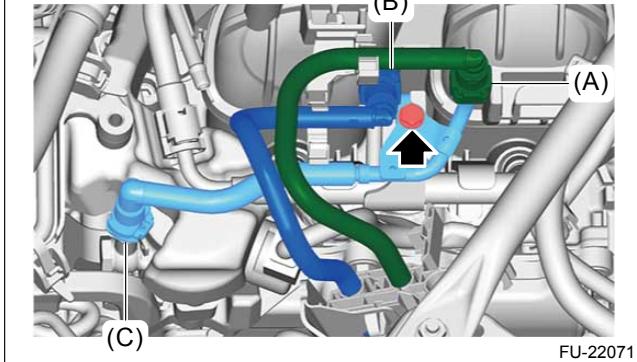
21. Disconnect the fuel delivery pipe assembly (C). [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>REMOVAL > QUICK CONNECTOR DISCONNECTION \(TYPE C\).](#)

22. Remove the fuel delivery pipe assembly.

Note:

Perform this procedure only when required.

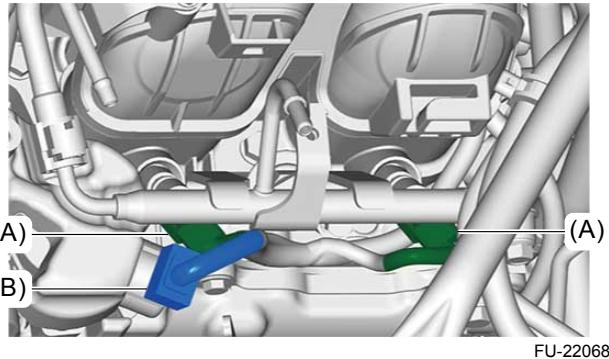
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23. Disconnect the connector (A) from the fuel injector (port injection side) LH.

24. Disconnect the connector (B) from high-pressure fuel pump.

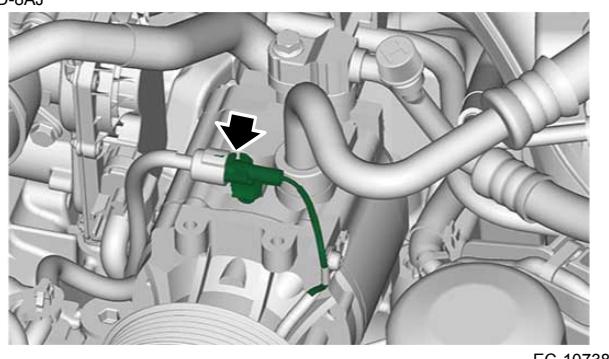
ZD-8AJ



25. Move the A/C compressor aside so that it does not interfere with the work.

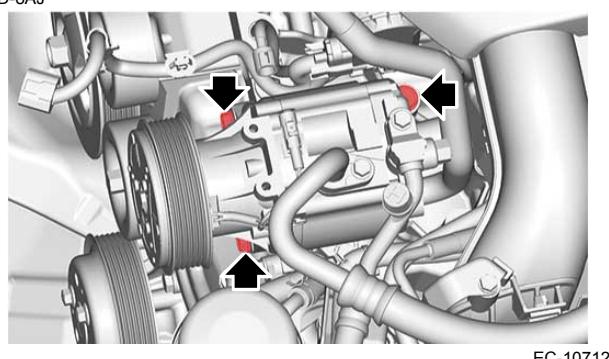
- (1) Remove the V-belts. [Ref. to MECHANICAL\(H4DO\)>V-belt>REMOVAL > V-BELT.](#)
- (2) Disconnect the connector.

ZD-8AJ



- (3) Remove the bolt securing the A/C compressor.

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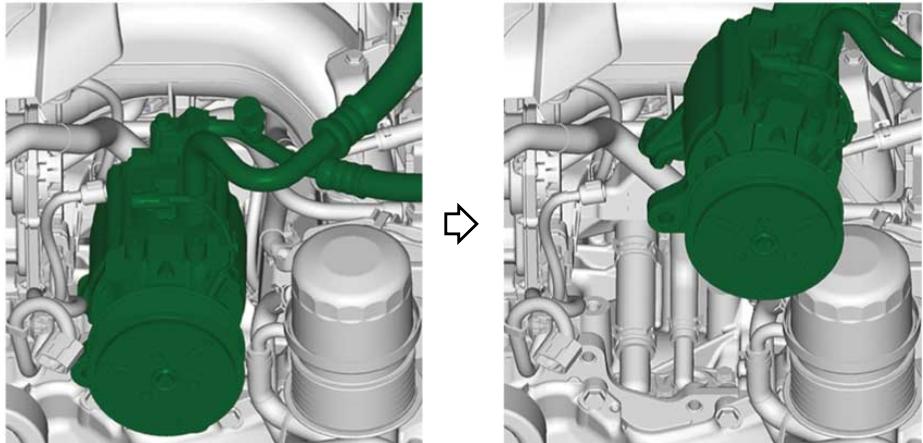


- (4) Move the A/C compressor as shown in the figure.

Caution:

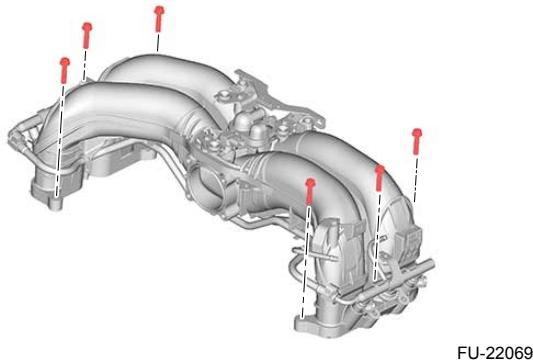
- Do not bend the pipe portion of the hose pressure discharge and the hose pressure suction.
- Be careful not to drop the A/C compressor.
- Be careful not to damage the adjacent parts with the A/C compressor.

ZD-8AJ



26. Remove the intake manifold assembly.

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FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Intake Manifold Assembly

INSTALLATION

1. Set a new gasket and install the intake manifold assembly.

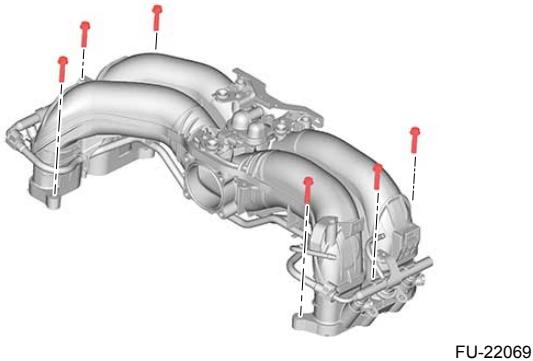
Note:

Be careful not to let the engine wiring harness be caught by the parts.

Tightening torque:

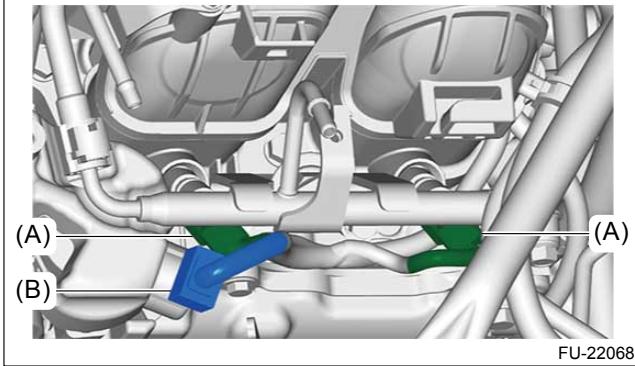
25 N·m (2.5 kgf-m, 18.4 ft-lb)

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2. Install the A/C compressor. [Ref. to AIR CONDITIONER>Compressor>INSTALLATION.](#)
3. Connect the connector (B) to the high-pressure fuel pump.
4. Connect the connectors (A) to the fuel injector (port injection side) LH.

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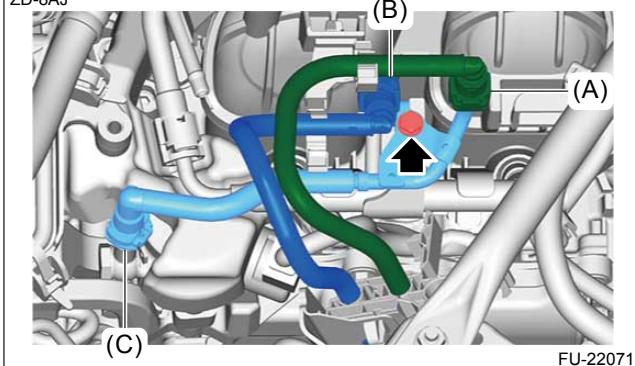
5. Install the fuel delivery pipe assembly.

Tightening torque:

9 N·m (0.9 kgf-m, 6.6 ft-lb)

6. Connect the fuel delivery pipe assembly (C). [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>INSTALLATION > QUICK CONNECTOR CONNECTION \(TYPE C\).](#)
7. Connect the fuel delivery tube (port injection side) (B). [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>INSTALLATION > QUICK CONNECTOR CONNECTION \(TYPE A\).](#)
8. Connect the fuel delivery tube (cylinder direct injection side) (A). [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>INSTALLATION > QUICK CONNECTOR CONNECTION \(TYPE A\).](#)

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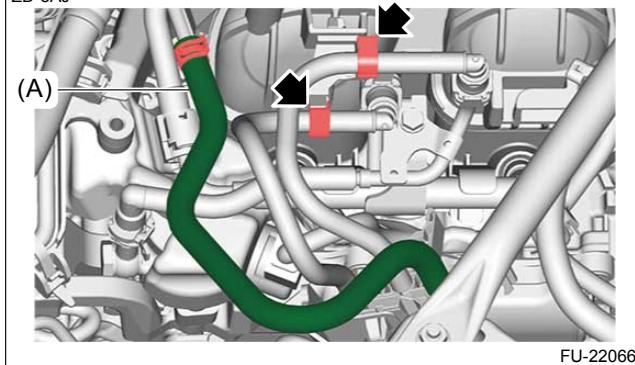


FU-22071

9. Secure the fuel delivery tube with the claw on the fuel delivery tube clamp.

10. Connect the evaporation hose (A).

ZD-8AJ



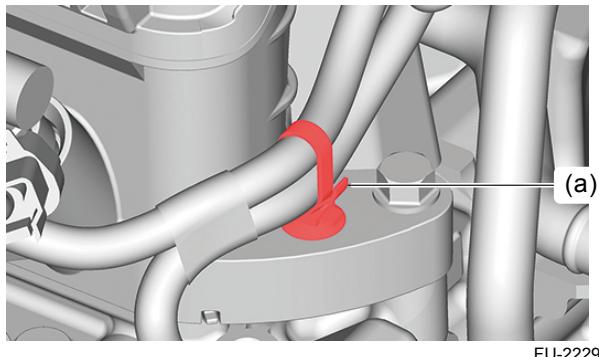
FU-22066

11. Hold the engine wiring harness with a new clip.

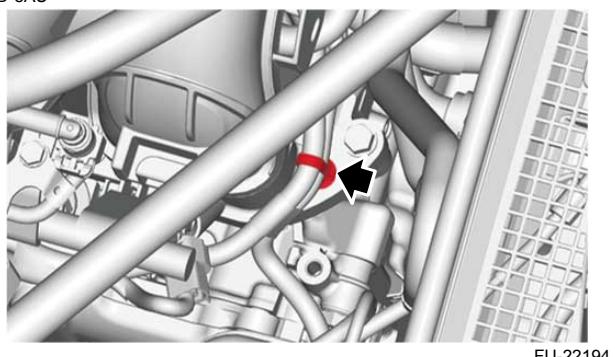
Note:

- Install the clip while aligning the alignment mark of the engine wiring harness.
- Install the clip so that the band exposed length (a) is as shown in the figure.

ZD-8AJ

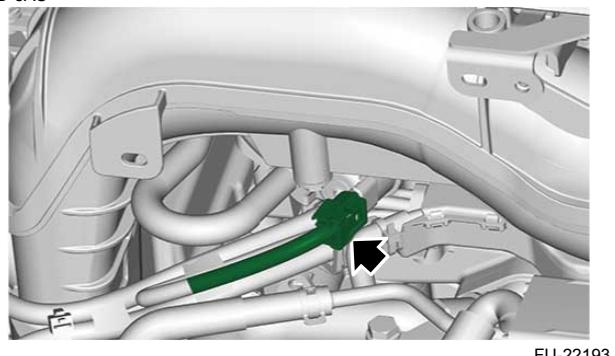


ZD-8AU



12. Connect the connector to the purge control solenoid valve.

ZD-8AU



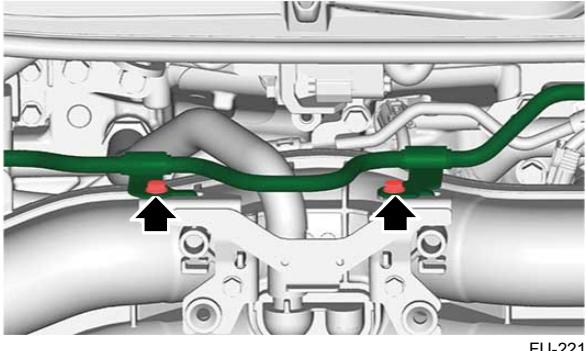
13. Install the fuel pipe protector LH No. 1. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Pipe Protector>INSTALLATION>FUEL PIPE PROTECTOR LH>FUEL PIPE PROTECTOR LH NO. 1.](#)

14. Secure the brake vacuum pipe with the bolts.

Tightening torque:

7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

ZD-8AU

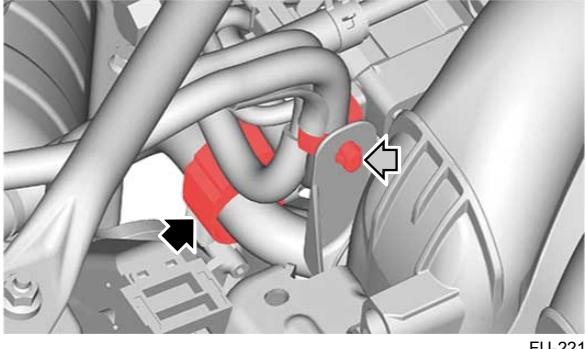


FU-22192

15.Secure the battery cable assembly with the clip.

16.Secure the engine wiring harness to the engine rear hanger.

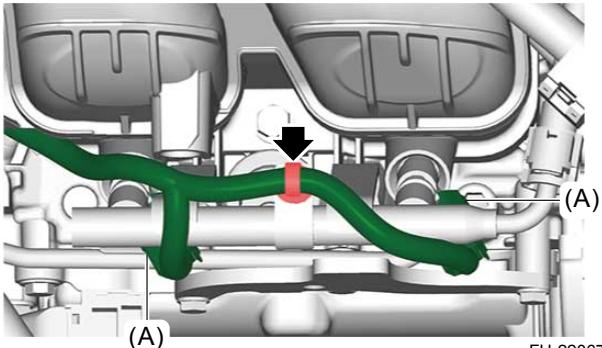
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FU-22191

17.Connect the connector (A) to the fuel injector (port injection side) RH and secure it with the clip.

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FU-22067

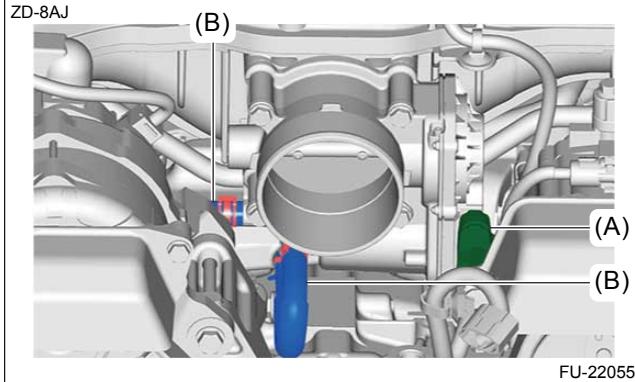
18.Install the fuel pipe protector RH No. 1. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Pipe Protector>INSTALLATION>FUEL PIPE PROTECTOR RH >FUEL PIPE PROTECTOR RH NO. 1.](#)

19.When the engine coolant remains before removing the intake manifold assembly

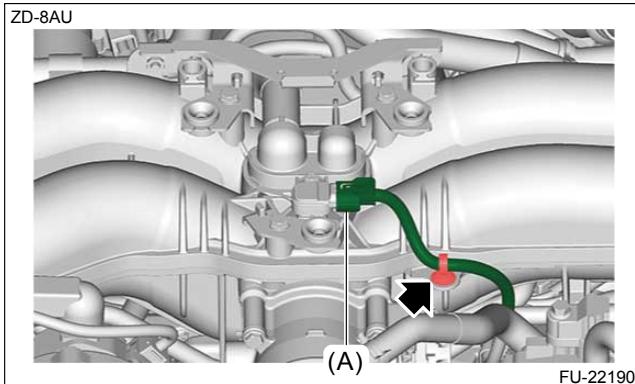
(1) Install the throttle body. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Throttle Body>INSTALLATION.](#)

20.When the engine coolant has been drained before removing the intake manifold assembly

(1) Connect the connector (A) to the throttle body and connect the preheater hoses (B).



21.Connect the connector (A) to the manifold absolute pressure sensor and secure it with the clip.



22.Install the PCV hose No. 1. [Ref. to EMISSION CONTROL \(AUX. EMISSION CONTROL DEVICES\)\(H4DO\)>PCV Hose>INSTALLATION > PCV HOSE NO. 1.](#)

23.Install the air intake boot. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Intake Boot>INSTALLATION.](#)

24.Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

25.Install the fuel filler cap, and close the fuel filler lid.

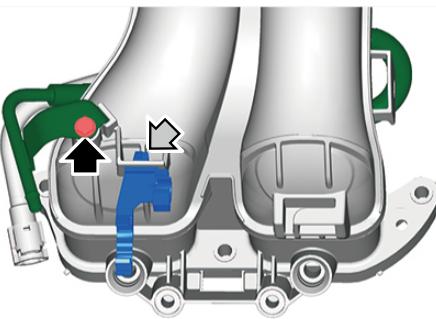
26.Check refrigerant leaks. [Ref. to AIR CONDITIONER>Refrigerant Leak Check>INSPECTION.](#)

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Intake Manifold Assembly

DISASSEMBLY

- 1.** When the engine coolant has been drained before removing the intake manifold assembly
 - (1) Remove the throttle body. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Throttle Body>REMOVAL.](#)
- 2.** Remove the fuel injector (port injection side). [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Injector>REMOVAL > PORT INJECTION SIDE.](#)
- 3.** Remove the purge control solenoid valve. [Ref. to EMISSION CONTROL \(AUX. EMISSION CONTROL DEVICES\)\(H4DO\)>Purge Control Solenoid Valve>REMOVAL.](#)
- 4.** Remove the manifold absolute pressure sensor. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Manifold Absolute Pressure Sensor>REMOVAL.](#)
- 5.** Remove the collector cover bracket. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Collector Cover>REMOVAL.](#)
- 6.** Remove the vacuum pipe and vacuum hose.
- 7.** Remove the fuel delivery tube clamp.

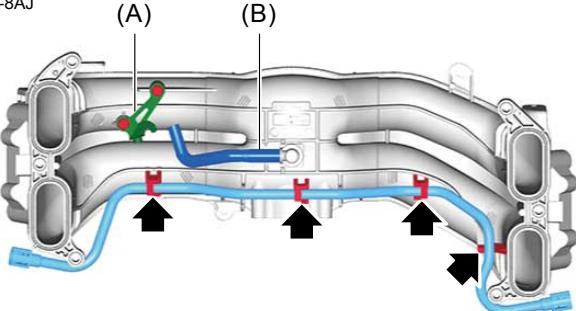
ZD-8AJ



FU-22072

- 8.** Remove the purge control solenoid valve bracket (A).
- 9.** Remove the vacuum hose (B).
- 10.** Remove the fuel delivery pipes.

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FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Intake Manifold Assembly

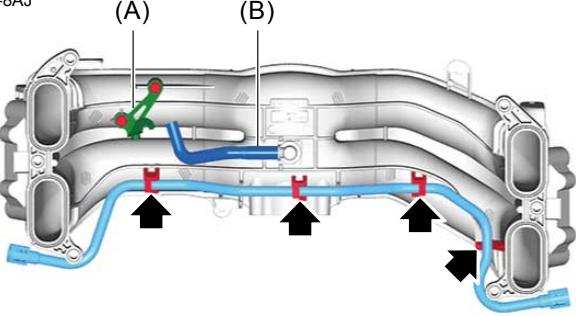
ASSEMBLY

- 1.** Install the fuel delivery pipe.
- 2.** Install the vacuum hose (B).
- 3.** Install the purge control solenoid valve bracket (A).

Tightening torque:

6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

ZD-8AJ



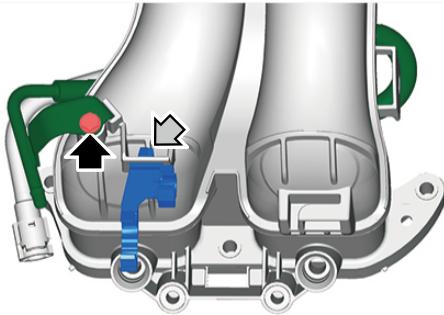
FU-22073

- 4.** Install the fuel delivery tube clamp.
- 5.** Install the vacuum pipe and vacuum hose.

Tightening torque:

6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

ZD-8AJ



FU-22072

6. Install the collector cover bracket. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Collector Cover>INSTALLATION.](#)
7. Install the manifold absolute pressure sensor. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Manifold Absolute Pressure Sensor>INSTALLATION.](#)
8. Install the purge control solenoid valve. [Ref. to EMISSION CONTROL \(AUX. EMISSION CONTROL DEVICES\)\(H4DO\)>Purge Control Solenoid Valve>INSTALLATION.](#)
9. Install the fuel injector (port injection side). [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Injector>INSTALLATION > PORT INJECTION SIDE.](#)
10. When the engine coolant has been drained before removing the intake manifold assembly
(1) Install the throttle body. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Throttle Body>INSTALLATION.](#)

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Intake Manifold Assembly

INSPECTION

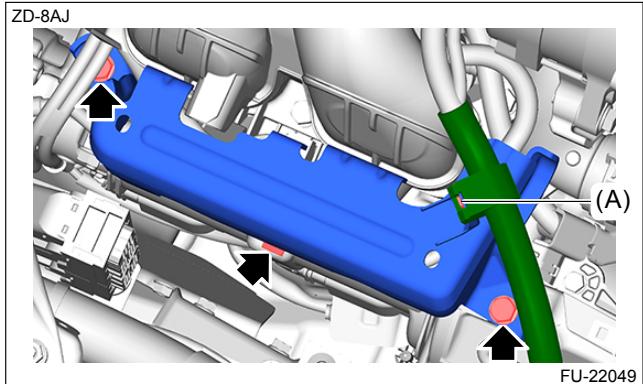
1. Check that the intake manifold assembly and the fuel pipe have no deformation, cracks and other damages.
2. Check that the hose has no cracks, damage or loose part.

REMOVAL

1. FUEL PIPE PROTECTOR RH

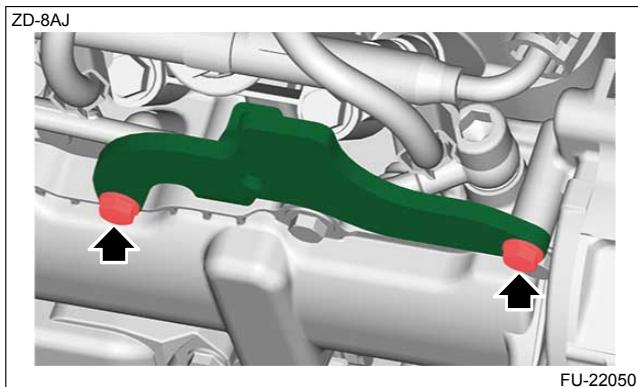
• FUEL PIPE PROTECTOR RH NO. 1

Remove the claw (A) holding the harness, and remove the fuel pipe protector RH No. 1.



• FUEL PIPE PROTECTOR RH NO. 2

1. Remove the fuel pipe protector RH No. 1. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Pipe Protector>REMOVAL>FUEL PIPE PROTECTOR RH >FUEL PIPE PROTECTOR RH NO. 1.](#)
2. Remove the fuel pipe protector RH No. 2.



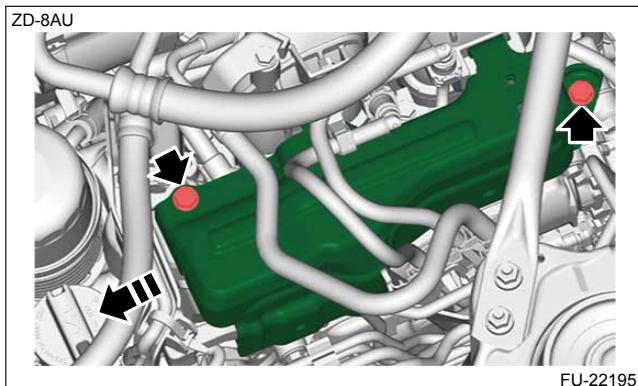
2. FUEL PIPE PROTECTOR LH

• FUEL PIPE PROTECTOR LH NO. 1

1. Remove the fuel pipe protector LH No. 1.

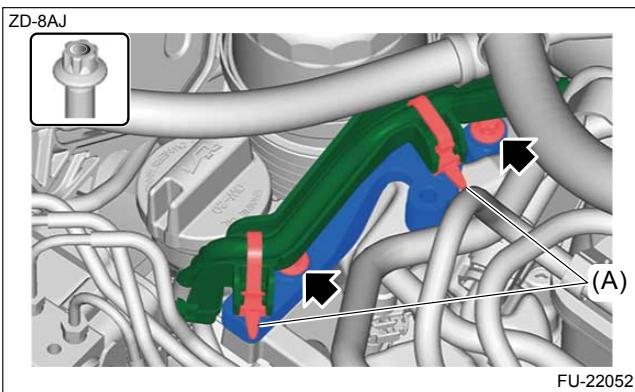
Note:

Remove from the vehicle front.



• FUEL PIPE PROTECTOR LH NO. 2

1. Remove the fuel pipe protector LH No. 1. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Pipe Protector>REMOVAL>FUEL PIPE PROTECTOR LH>FUEL PIPE PROTECTOR LH NO. 1.](#)
2. Remove the clip (A) holding the engine wiring harness, and remove the fuel pipe protector LH No. 2 using TORX®E12.



• FUEL PIPE PROTECTOR LH NO. 3

1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Perform the steps below to remove the air intake boot, and place it aside so that it does not interfere with the work.

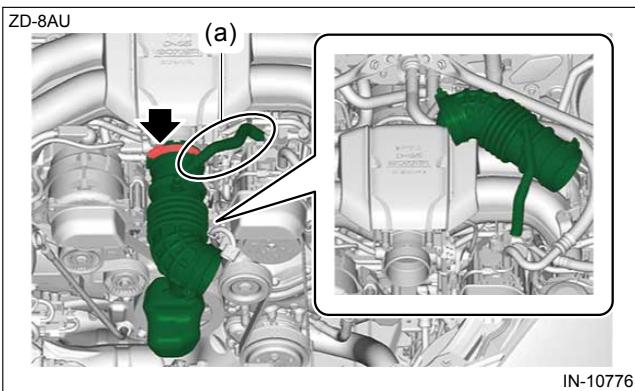
Caution:

Do not disconnect the PCV hose No. 2 (a).

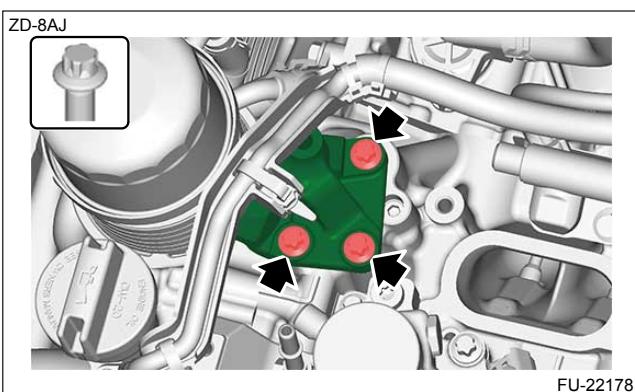
- (1) Remove the air cleaner case. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Cleaner Case>REMOVAL.](#)
- (2) Loosen the clamp, remove the air intake boot, and place it aside so that it does not interfere with the work.

Caution:

Be careful not to pull out the PCV hose No. 2 (a).



3. Remove the high-pressure fuel delivery pipes. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>High Pressure Fuel Delivery Pipe>REMOVAL > HIGH-PRESSURE FUEL DELIVERY PIPE.](#)
4. Using TORX®E10, remove the fuel pipe protector LH No. 3.



INSTALLATION

1. FUEL PIPE PROTECTOR RH

- **FUEL PIPE PROTECTOR RH NO. 1**

Install the fuel pipe protector RH No. 1 and secure the harness with the claw.

Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)

- **FUEL PIPE PROTECTOR RH NO. 2**

1. Install the fuel pipe protector RH No. 2.

Tightening torque:

6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

2. Install the fuel pipe protector RH No. 1. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Pipe Protector>INSTALLATION>FUEL PIPE PROTECTOR RH >FUEL PIPE PROTECTOR RH NO. 1.](#)

2. FUEL PIPE PROTECTOR LH

- **FUEL PIPE PROTECTOR LH NO. 1**

1. Install the fuel pipe protector LH No. 1.

Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)

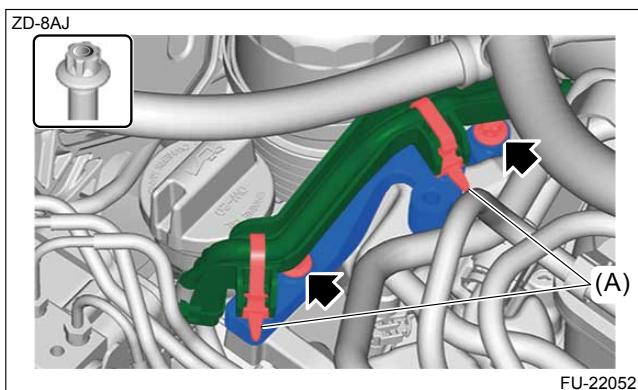
- **FUEL PIPE PROTECTOR LH NO. 2**

1. Using TORX® E12, install the fuel pipe protector LH No. 2.

Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)

2. Hold the engine wiring harness with the clip (A).



3. Install the fuel pipe protector LH No. 1. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Pipe Protector>INSTALLATION>FUEL PIPE PROTECTOR LH >FUEL PIPE PROTECTOR LH NO. 1.](#)

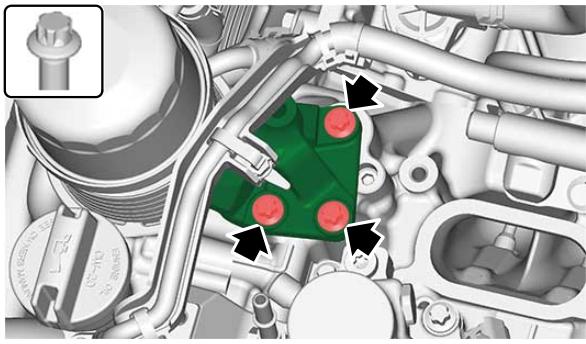
- **FUEL PIPE PROTECTOR LH NO. 3**

1. Using TORX® E10, install the fuel pipe protector LH No. 3.

Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)

ZD-8AJ



FU-22178

2. Install the high-pressure fuel delivery pipe. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>High Pressure Fuel Delivery Pipe>INSTALLATION > HIGH-PRESSURE FUEL DELIVERY PIPE.](#)
3. Install the air intake boot. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Intake Boot>INSTALLATION.](#)
4. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Pipe Protector

INSPECTION

Check that the fuel pipe protector has no deformation, cracks or other damages.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Insulator

REMOVAL

1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Perform the steps below to remove the air intake boot, and place it aside so that it does not interfere with the work.

Caution:

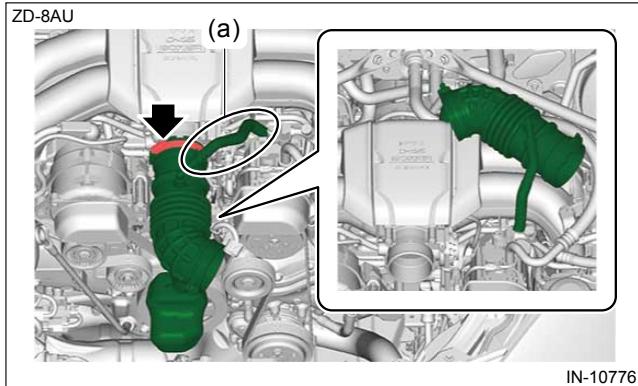
Do not disconnect the PCV hose No. 2 (a).

(1) Remove the air cleaner case. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Cleaner Case>REMOVAL.](#)

(2) Loosen the clamp, remove the air intake boot, and place it aside so that it does not interfere with the work.

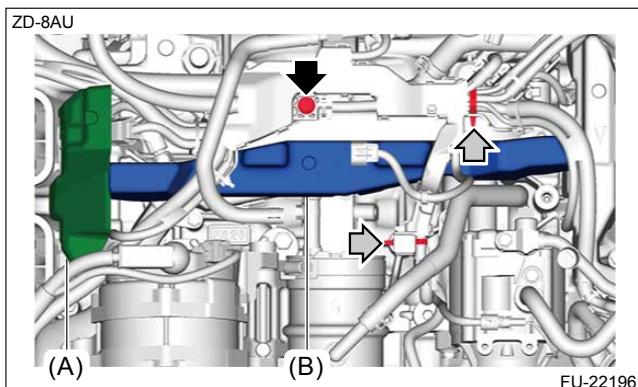
Caution:

Be careful not to pull out the PCV hose No. 2 (a).



IN-10776

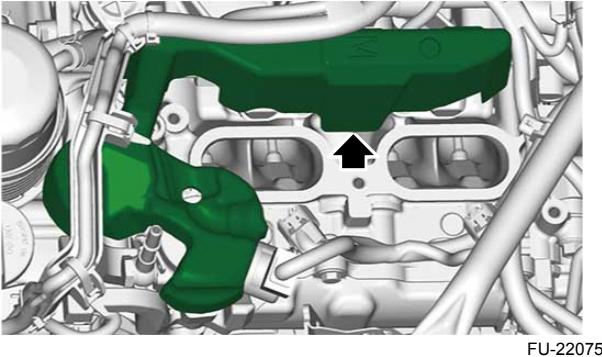
3. Remove the intake manifold assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Intake Manifold Assembly>REMOVAL.](#)
4. Remove the fuel pipe insulator No. 1 (A).
5. Remove the bolt and clip securing the engine wiring harness.
6. Remove the fuel pipe insulator No. 2 (B).



FU-22196

7. Remove the fuel pipe protector LH No. 2. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Pipe Protector>REMOVAL>FUEL PIPE PROTECTOR LH>FUEL PIPE PROTECTOR LH NO. 2.](#)
8. Remove the fuel pipe insulator No. 3.

ZD-8AJ



FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Insulator

INSTALLATION

Caution:

- If substantial amount of fuel or parts cleaner come into contact with the fuel pipe insulator, replace it with a new part.
- If only small amount of fuel comes into contact with the fuel pipe insulator, wait for the fuel to evaporate before installing it.

1. Install the fuel pipe insulator No. 3.
2. Install the fuel pipe protector LH No. 2. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Pipe Protector>INSTALLATION>FUEL PIPE PROTECTOR LH>FUEL PIPE PROTECTOR LH NO. 2.](#)
3. Install the fuel pipe insulator No. 2.
4. Install the engine wiring harness with the bolt and clip.
Tightening torque:
19 N·m (1.9 kgf-m, 14.0 ft-lb)
5. Install the fuel pipe insulator No. 1.
6. Install the intake manifold assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Intake Manifold Assembly>INSTALLATION.](#)
7. Install the air intake boot. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Intake Boot>INSTALLATION.](#)
8. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Insulator

INSPECTION

Check that the fuel insulator has no deformation, cracks or other damages.

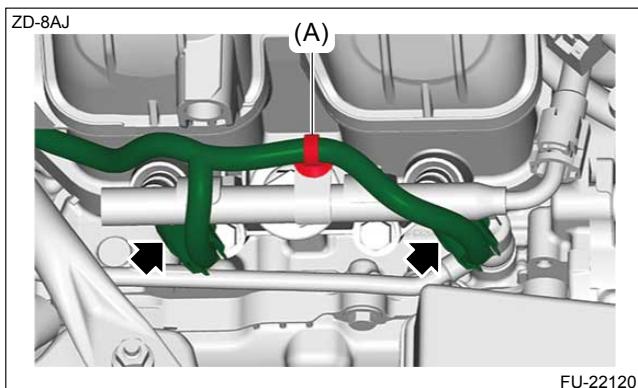
REMOVAL**1. PORT INJECTION SIDE**

• RH

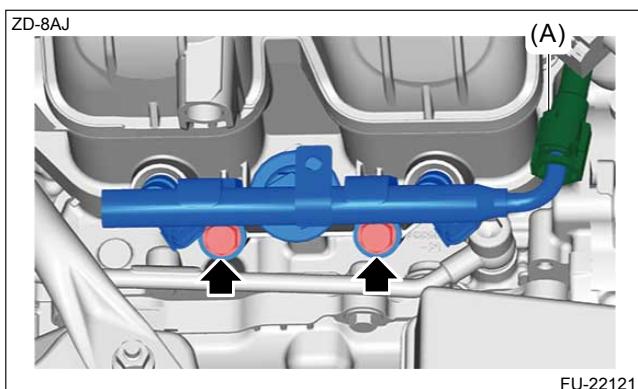
Caution:

- Be careful not to spill fuel.
- Catch the fuel from the pipes using a container or cloth.

1. Release the fuel pressure. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel>PROCEDURE > RELEASING OF FUEL PRESSURE.](#)
2. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
3. Remove the fuel pipe protector RH No. 2. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Pipe Protector>REMOVAL>FUEL PIPE PROTECTOR RH >FUEL PIPE PROTECTOR RH NO. 2.](#)
4. Disconnect the connector from fuel injector and remove the clip (A).



5. Disconnect the fuel delivery pipe (A). [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>REMOVAL > QUICK CONNECTOR DISCONNECTION \(TYPE B\).](#)
6. Remove the fuel pipe RH together with the fuel injector.

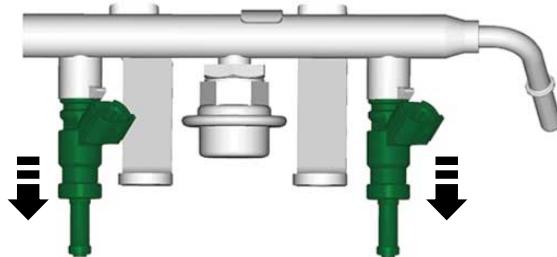


7. Remove the fuel injector.

Caution:

- If the tip of the fuel injector is hit or the fuel injector is dropped, replace the fuel injector with a new part.
- When the fuel injector is reinstalled again without replacing it, identify it with a tag etc. marked with the cylinder number.

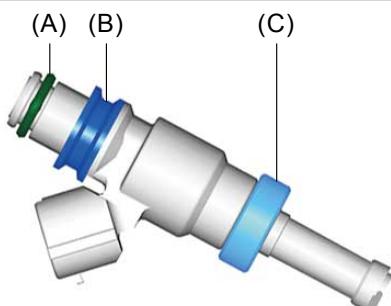
ZD-8AJ



FU-22123

8. Remove the O-ring (A), rubber (B) and seal ring (C).

ZD-8AJ



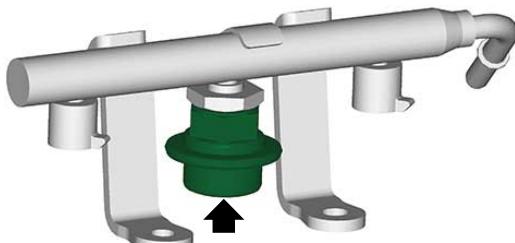
FU-22125

9. Remove the pulsation damper.

Note:

Perform this procedure only when required.

ZD-8AJ



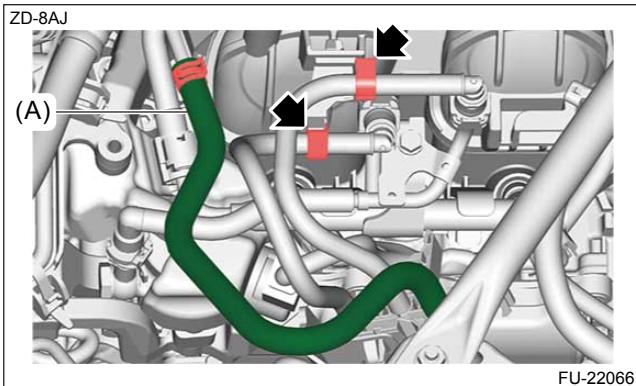
FU-22126

• LH

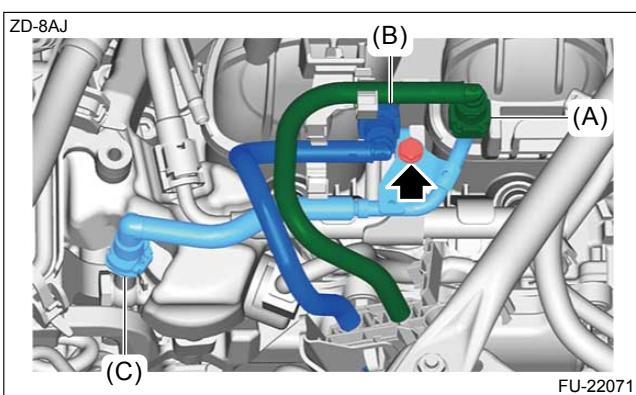
Caution:

- Be careful not to spill fuel.
- Catch the fuel from the pipes using a container or cloth.

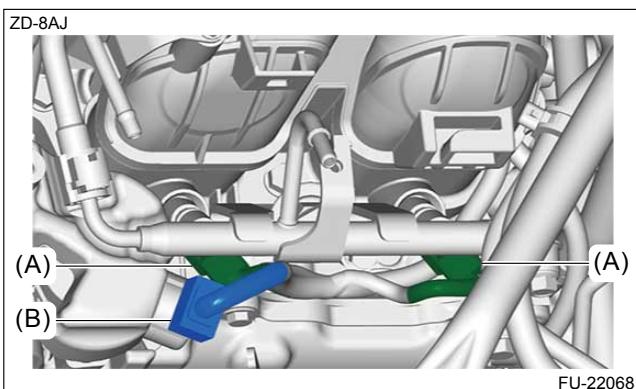
1. Release the fuel pressure. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel>PROCEDURE > RELEASING OF FUEL PRESSURE.](#)
2. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
3. Remove the fuel pipe protector LH No. 1. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Pipe Protector>REMOVAL>FUEL PIPE PROTECTOR LH>FUEL PIPE PROTECTOR LH NO. 1.](#)
4. Disconnect the evaporation hose (A).
5. Open the claw on the fuel delivery tube clamp.



6. Disconnect the fuel delivery tube (cylinder direct injection side) (A). [Ref. to FUEL INJECTION \(FUEL SYSTEMS\) \(H4DO\)>Fuel Delivery and Evaporation Lines>REMOVAL > QUICK CONNECTOR DISCONNECTION \(TYPE A\).](#)
7. Disconnect the fuel delivery tube (port injection side) (B). [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>REMOVAL > QUICK CONNECTOR DISCONNECTION \(TYPE A\).](#)
8. Disconnect the fuel delivery pipe assembly (C). [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>REMOVAL > QUICK CONNECTOR DISCONNECTION \(TYPE C\).](#)
9. Remove the fuel delivery pipe assembly.

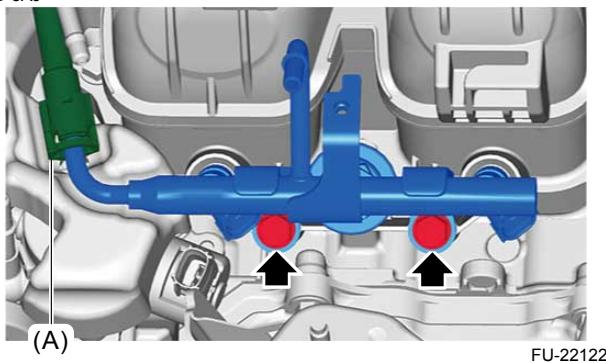


10. Disconnect the connectors (A) from fuel injector.
11. Disconnect the connector (B) from high-pressure fuel pump.



12. Disconnect the fuel delivery pipe (A). [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>REMOVAL > QUICK CONNECTOR DISCONNECTION \(TYPE B\).](#)
13. Remove the fuel pipe LH together with the fuel injector.

ZD-8AJ

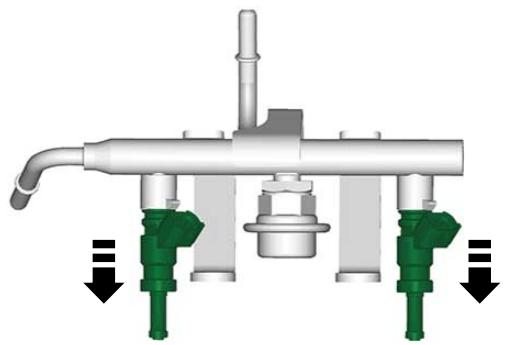


14. Remove the fuel injector.

Caution:

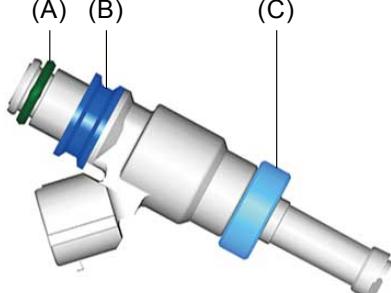
- If the tip of the fuel injector is hit or the fuel injector is dropped, replace the fuel injector with a new part.
- When the fuel injector is reinstalled again without replacing it, identify it with a tag etc. marked with the cylinder number.

ZD-8AJ



15. Remove the O-ring (A), rubber (B) and seal ring (C).

ZD-8AJ

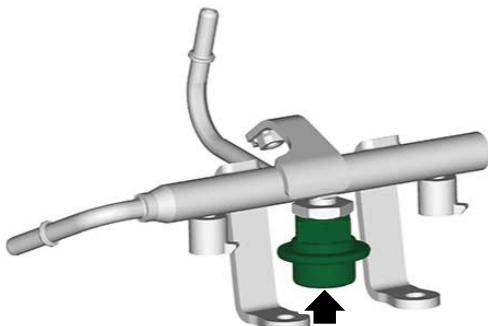


16. Remove the pulsation damper.

Note:

Perform this procedure only when required.

ZD-8AJ



FU-22127

2. CYLINDER DIRECT INJECTION SIDE

• RH

Caution:

- Be careful not to spill fuel.
- Catch the fuel from the pipes using a container or cloth.

1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Perform the steps below to remove the air intake boot, and place it aside so that it does not interfere with the work.

Caution:

Do not disconnect the PCV hose No. 2 (a).

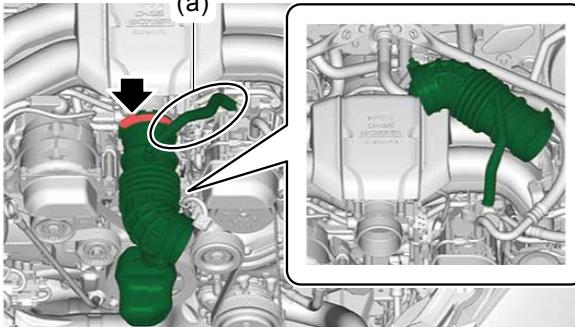
(1) Remove the air cleaner case. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Cleaner Case>REMOVAL.](#)

(2) Loosen the clamp, remove the air intake boot, and place it aside so that it does not interfere with the work.

Caution:

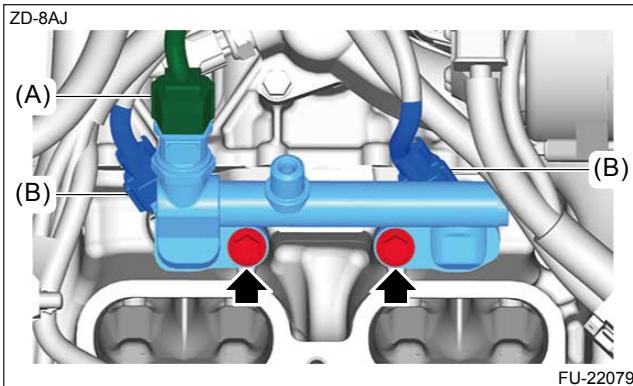
Be careful not to pull out the PCV hose No. 2 (a).

ZD-8AU



IN-10776

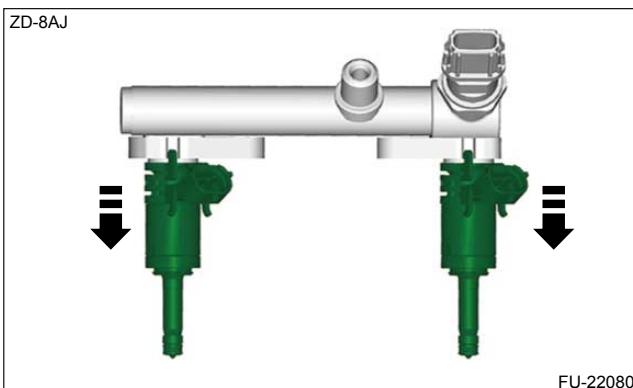
3. Remove the high-pressure fuel delivery pipe assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>High Pressure Fuel Delivery Pipe>REMOVAL > HIGH-PRESSURE FUEL DELIVERY PIPE ASSEMBLY.](#)
4. Remove the connector (A) and connector (B).
5. Remove the fuel injector pipe RH together with the fuel injector assembly.



6. Remove the fuel injector assembly.

Caution:

- If the tip of the fuel injector assembly is hit or the assembly is dropped, replace the fuel injector assembly with a new part.
- Pull out the assembly straight so that the seal surface of the fuel injector pipe RH is not damaged.
- Identify the removed fuel injector assembly with a tag etc. marked with the cylinder number.



• LH

Caution:

- Be careful not to spill fuel.
- Catch the fuel from the pipes using a container or cloth.

1. Disconnect the ground terminal from battery sensor. Ref. to REPAIR CONTENTS>NOTE > BATTERY.
2. Perform the steps below to remove the air intake boot, and place it aside so that it does not interfere with the work.

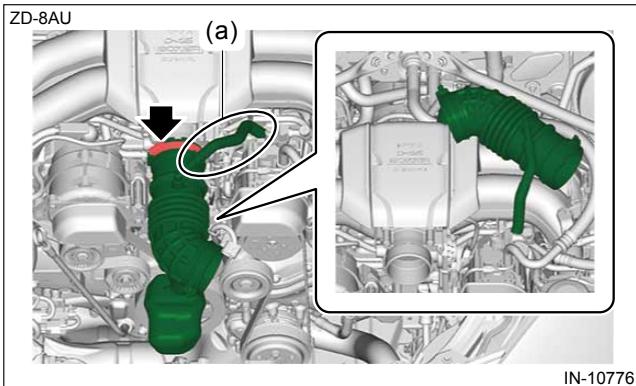
Caution:

Do not disconnect the PCV hose No. 2 (a).

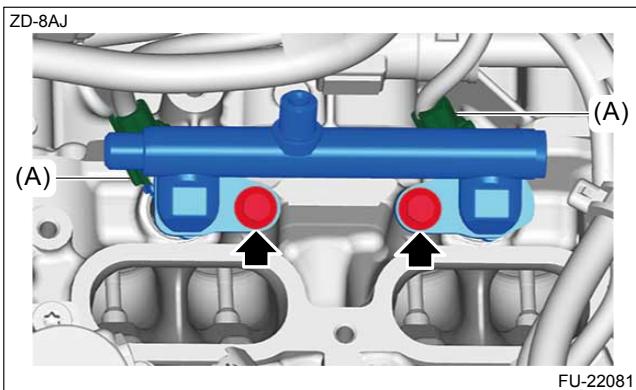
- (1) Remove the air cleaner case. Ref. to INTAKE (INDUCTION)(H4DO)>Air Cleaner Case>REMOVAL.
- (2) Loosen the clamp, remove the air intake boot, and place it aside so that it does not interfere with the work.

Caution:

Be careful not to pull out the PCV hose No. 2 (a).



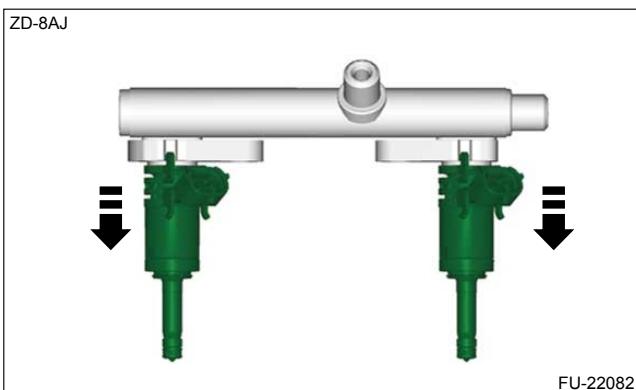
3. Remove the high-pressure fuel delivery pipe assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>High Pressure Fuel Delivery Pipe>REMOVAL > HIGH-PRESSURE FUEL DELIVERY PIPE ASSEMBLY.](#)
4. Remove the high-pressure fuel delivery pipes. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>High Pressure Fuel Delivery Pipe>REMOVAL > HIGH-PRESSURE FUEL DELIVERY PIPE.](#)
5. Disconnect the connector (A).
6. Remove the fuel injector pipe LH together with the fuel injector assembly.



7. Remove the fuel injector assembly.

Caution:

- If the tip of the fuel injector assembly is hit or the assembly is dropped, replace the fuel injector assembly with a new part.
- Pull out the assembly straight so that the seal surface of the fuel injector pipe LH is not damaged.
- Identify the removed fuel injector assembly with a tag etc. marked with the cylinder number.



FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Injector INSTALLATION

1. PORT INJECTION SIDE

- RH

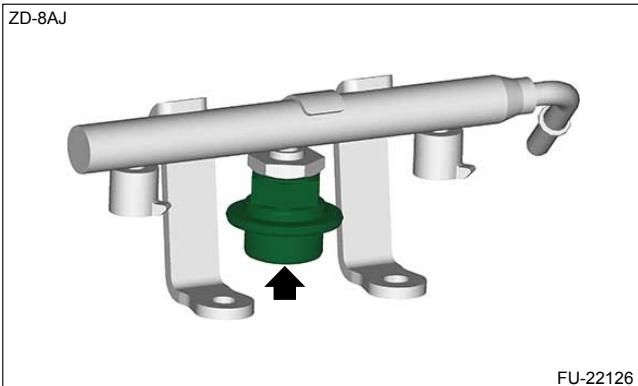
- Using a new gasket, install the pulsation damper.

Caution:

- Check that the seal surfaces of the pulsation damper and the fuel pipe have no deformation, cracks or other damages.
- Check that the seal surfaces of the pulsation damper and the fuel pipe have no foreign materials.
- Be careful not to deform the fuel pipe.

Tightening torque:

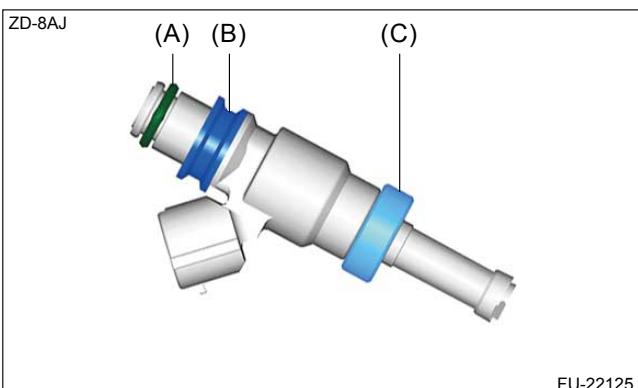
21.6 N·m (2.2 kgf-m, 15.9 ft-lb)



- Install a new O-ring (A), new rubber (B) and new seal ring (C).

Caution:

- Check the O-ring groove of the fuel injector for foreign materials or damage.
- If the tip of the fuel injector is hit or the fuel injector is dropped, replace the fuel injector with a new part.

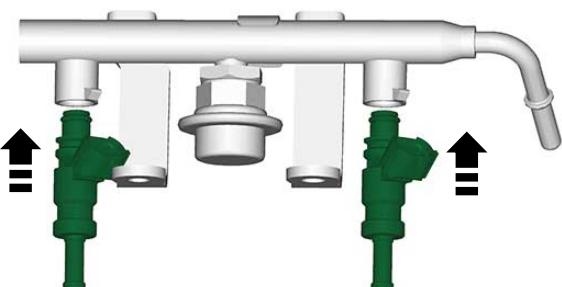


- Install the fuel injector straight to the fuel pipe RH.

Caution:

- Degrease inside of the fuel injector insertion hole of the fuel pipe.
- Check the inside of the fuel injector insertion hole of the fuel pipe for foreign materials or damage.
- Be careful not to allow gasoline to contact with the O-ring and the inside of the mounting hole.
- Apply liquid paraffin to the O-ring and install it.
- Be careful not to twist the O-ring.
- To prevent damage to the O-ring, insert the part straight along the fuel injector insertion axis without tilting it and avoid removing and inserting the part again.
- To prevent the tip of the fuel injector from bending, do not apply force to the fuel injector tip.
- Check that the tip of the fuel injector has no bend or damage.
- After installing the fuel injector to the fuel pipe, confirm that it can be rotated lightly. If it cannot be rotated, replace the O-ring with new one again.

ZD-8AJ



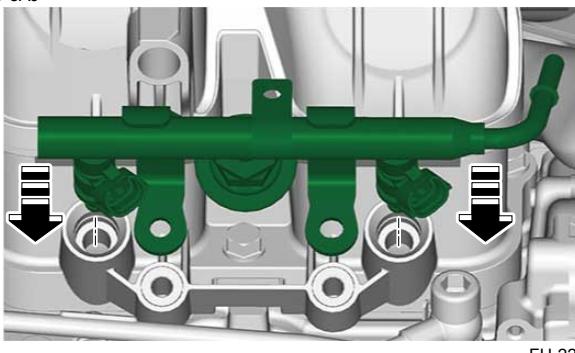
FU-22128

- Insert the fuel pipe RH and fuel injector as a single unit into the intake manifold assembly, and align their positions. Then, evenly press the parts in.

Caution:

In order to prevent damaging the O-ring, do not install the fuel pipe and fuel injector by tilting them toward the intake manifold assembly.

ZD-8AJ



FU-22130

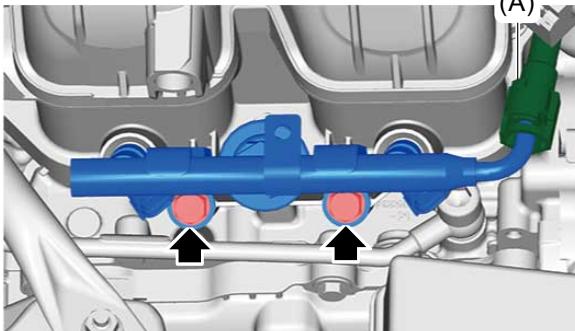
- Tighten the bolts which hold the fuel pipe RH.

Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)

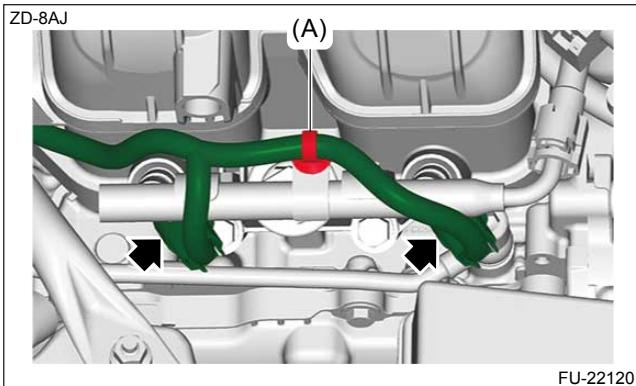
- Connect the fuel delivery pipe (A). [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>INSTALLATION > QUICK CONNECTOR CONNECTION \(TYPE B\).](#)

ZD-8AJ



FU-22121

- Connect the connectors to the fuel injector and install the clip (A).



8. Install the fuel pipe protector RH No. 2. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Pipe Protector>INSTALLATION>FUEL PIPE PROTECTOR RH >FUEL PIPE PROTECTOR RH NO. 2.](#)
9. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

• LH

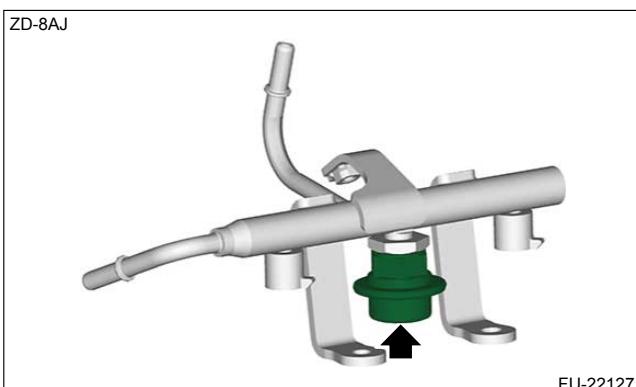
1. Using a new gasket, install the pulsation damper.

Caution:

- Check that the seal surfaces of the pulsation damper and the fuel pipe have no deformation, cracks or other damages.
- Check that the seal surfaces of the pulsation damper and the fuel pipe have no foreign materials.
- Be careful not to deform the fuel pipe.

Tightening torque:

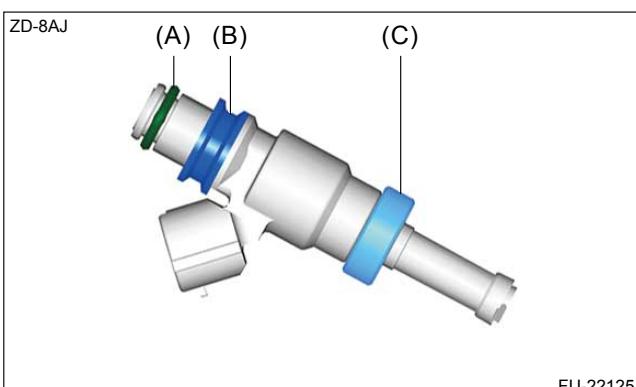
21.6 N·m (2.2 kgf-m, 15.9 ft-lb)



2. Install a new O-ring (A), new rubber (B) and new seal ring (C).

Caution:

- Check the O-ring groove of the fuel injector for foreign materials or damage.
- If the tip of the fuel injector is hit or the fuel injector is dropped, replace the fuel injector with a new part.

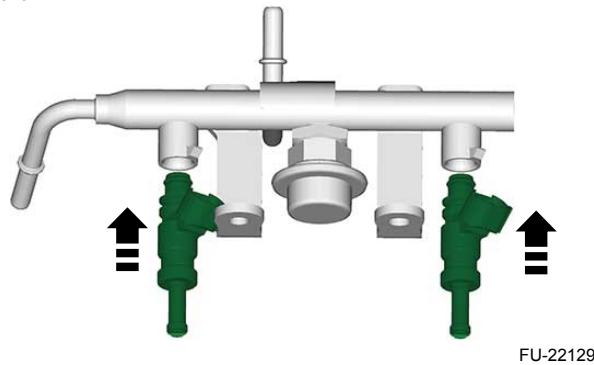


3. Install the fuel injector straight to the fuel pipe LH.

Caution:

- Degrease inside of the fuel injector insertion hole of the fuel pipe.
- Check the inside of the fuel injector insertion hole of the fuel pipe for foreign materials or damage.
- Be careful not to allow gasoline to contact with the O-ring and the inside of the mounting hole.
- Apply liquid paraffin to the O-ring and install it.
- Be careful not to twist the O-ring.
- To prevent damage to the O-ring, insert the part straight along the fuel injector insertion axis without tilting it and avoid removing and inserting the part again.
- To prevent the tip of the fuel injector from bending, do not apply force to the fuel injector tip.
- Check that the tip of the fuel injector has no bend or damage.
- After installing the fuel injector to the fuel pipe, confirm that it can be rotated lightly. If it cannot be rotated, replace the O-ring with new one again.

ZD-8AJ

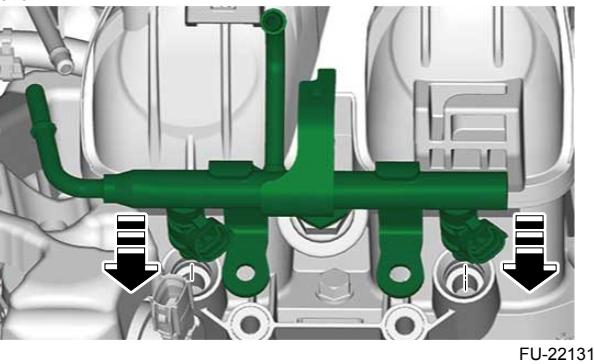


4. Insert the fuel pipe LH and fuel injector as a single unit into the intake manifold assembly, and align their positions. Then, evenly press the parts in.

Caution:

In order to prevent damaging the O-ring, do not install the fuel pipe and fuel injector by tilting them toward the intake manifold assembly.

ZD-8AJ



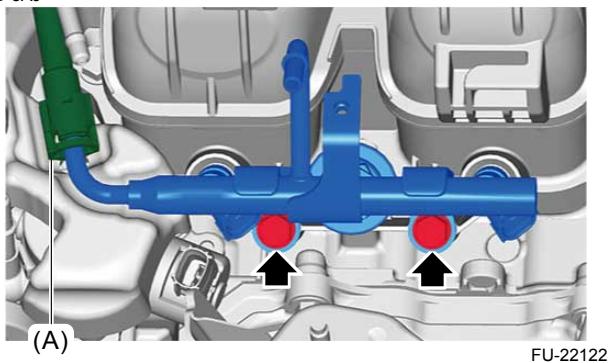
5. Tighten the bolts which hold the fuel pipe LH.

Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)

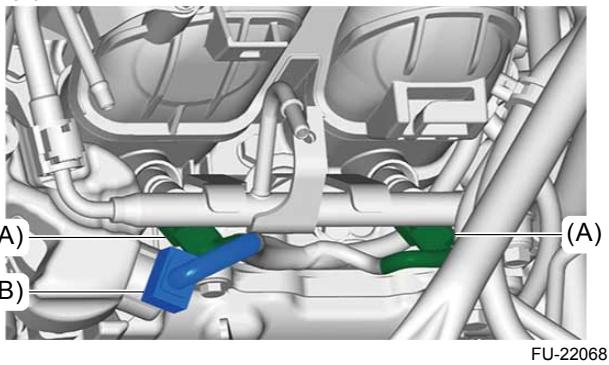
6. Connect the fuel delivery pipe (A). Ref. to FUEL INJECTION (FUEL SYSTEMS)(H4DO)>Fuel Delivery and Evaporation Lines>INSTALLATION > QUICK CONNECTOR CONNECTION (TYPE B).

ZD-8AJ



7. Connect the connector (B) to the high-pressure fuel pump.
8. Connect the connectors (A) to fuel injector.

ZD-8AJ



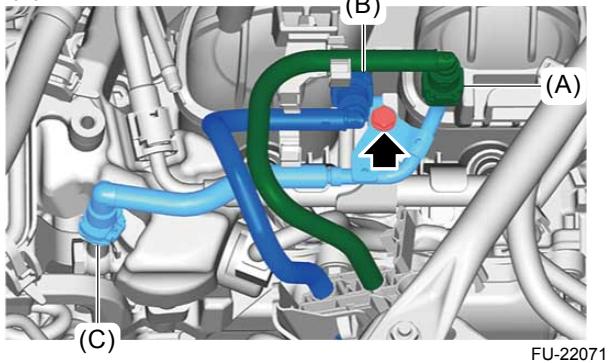
9. Install the fuel delivery pipe assembly.

Tightening torque:

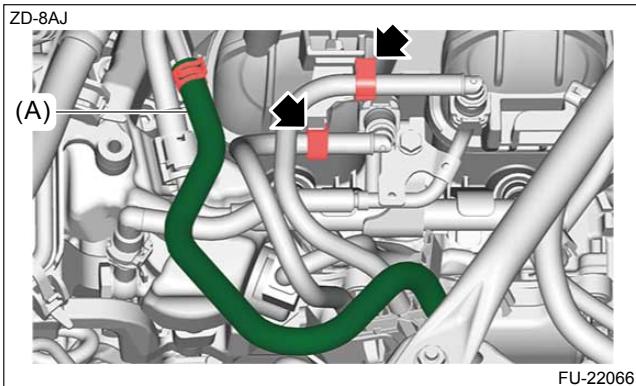
9 N·m (0.9 kgf-m, 6.6 ft-lb)

10. Connect the fuel delivery pipe assembly (C). [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>INSTALLATION > QUICK CONNECTOR CONNECTION \(TYPE C\).](#)
11. Connect the fuel delivery tube (port injection side) (B). [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>INSTALLATION > QUICK CONNECTOR CONNECTION \(TYPE A\).](#)
12. Connect the fuel delivery tube (cylinder direct injection side) (A). [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>INSTALLATION > QUICK CONNECTOR CONNECTION \(TYPE A\).](#)

ZD-8AJ



13. Secure the fuel delivery tube with the claw on the fuel delivery tube clamp.
14. Connect the evaporation hose (A).



15. Install the fuel pipe protector LH No. 1. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Pipe Protector>INSTALLATION>FUEL PIPE PROTECTOR LH>FUEL PIPE PROTECTOR LH NO. 1.](#)

16. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

2. CYLINDER DIRECT INJECTION SIDE

- RH

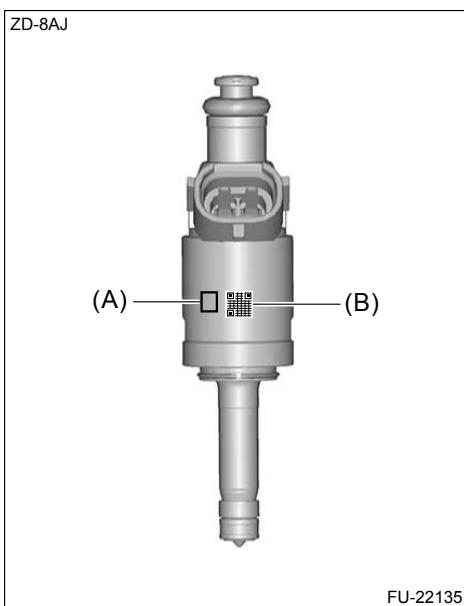
1. When replacing the fuel injector assembly with a new one

Caution:

When replacing the fuel injector assembly, select the assembly with the same flow rate stratification number.

Note:

The flow rate stratification numbers of all 4 cylinders are identical.



(A) Flow rate stratification
number

(B) QR code

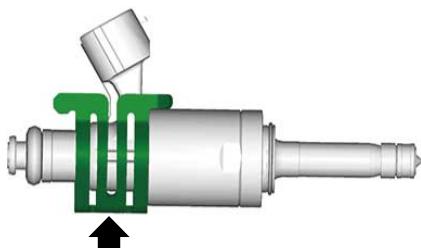
2. When reusing the fuel injector

(1) Prepare the fuel injector assembly using the following new parts. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Injector>REPLACEMENT.](#)

- Stopper ring
- O-ring seal
- Back-up ring
- Fuel injector insulator
- Fuel injector ring
- Fuel injector seal

3. Install the fuel injector holder.

ZD-8AJ



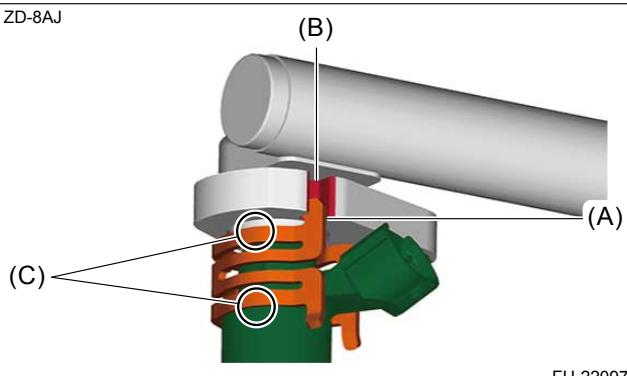
FU-22096

4. Align the protrusion of the fuel injector holder to the anti-rotation slot of the fuel injector pipe RH, and install the fuel injector straight to the fuel injector pipe RH.

Caution:

- Degrease inside of the fuel injector insertion hole of the fuel injector pipe.
- Check the inside of the fuel injector insertion hole of the fuel injector pipe for foreign materials or damage.
- Be careful not to allow gasoline to contact with the fuel injector seal and the inside of the mounting hole.
- Apply liquid paraffin to the O-ring seal and install it.
- Be careful not to twist the O-ring seal.
- To prevent damage to the O-ring seal, insert the part straight along the fuel injector insertion axis without tilting it and avoid removing and inserting the part again.
- To prevent the tip of the fuel injector from bending, do not apply force to the fuel injector tip.
- Check that the tip of the fuel injector has no bend or damage.
- Make sure there is no gap between the fuel injector pipe and the fuel injector holder.
- Make sure there is no gap between the fuel injector and the fuel injector holder.

ZD-8AJ



FU-22097

(A) Protrusion portion

(B) Anti-rotation slot

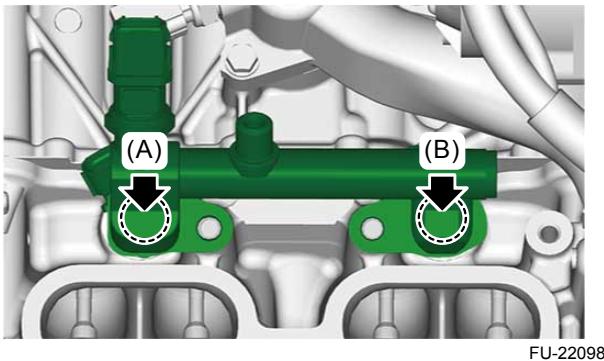
(C) No gap allowed.

5. Insert the fuel injector pipe RH and fuel injector as a single unit into the cylinder head, and align their positions. Then, evenly press the sections (A) and (B).

Caution:

- When installing, apply liquid paraffin to the fuel injector seal.
- In order to prevent damaging the O-ring seal, do not install the fuel injector pipe and fuel injector by tilting them toward the cylinder head.

ZD-8AJ



FU-22098

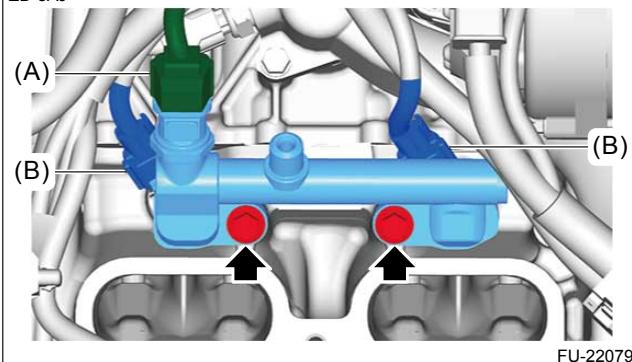
6. Tighten the bolts which hold the fuel injector pipe RH.

Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)

7. Connect the connector (B) and connector (A).

ZD-8AJ



FU-22079

8. Install the high-pressure fuel delivery pipe assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>High Pressure Fuel Delivery Pipe>INSTALLATION > HIGH-PRESSURE FUEL DELIVERY PIPE ASSEMBLY.](#)
9. Install the air intake boot. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Intake Boot>INSTALLATION.](#)
10. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

● LH

1. When replacing the fuel injector assembly with a new one

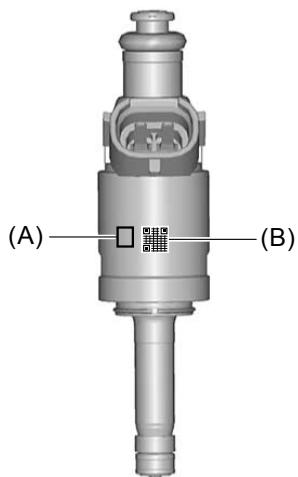
Caution:

When replacing the fuel injector assembly, select the assembly with the same flow rate stratification number.

Note:

The flow rate stratification numbers of all 4 cylinders are identical.

ZD-8AJ



FU-22135

- (A) Flow rate stratification
number
(B) QR code

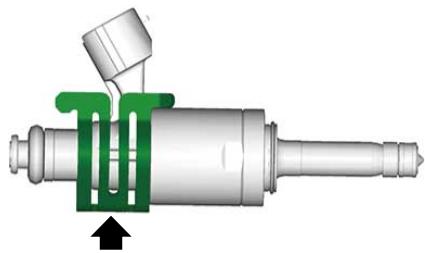
2. When reusing the fuel injector

- (1) Prepare the fuel injector assembly using the following new parts. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\), \(H4DO\)>Fuel Injector>REPLACEMENT.](#)

- Stopper ring
- O-ring seal
- Back-up ring
- Fuel injector insulator
- Fuel injector ring
- Fuel injector seal

3. Install the fuel injector holder.

ZD-8AJ

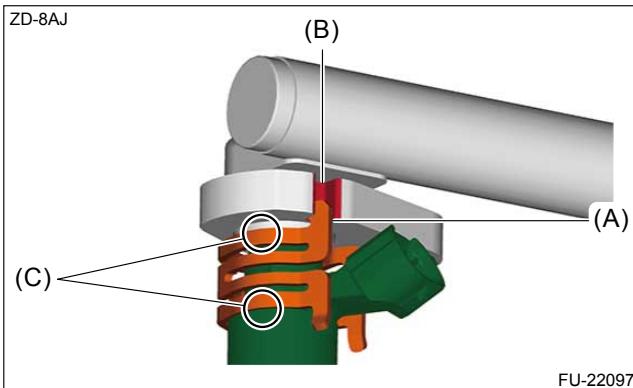


FU-22096

- 4.** Align the protrusion of the fuel injector holder to the anti-rotation slot of the fuel injector pipe LH, and install the fuel injector straight to the fuel injector pipe LH.

Caution:

- Degrease inside of the fuel injector insertion hole of the fuel injector pipe.
- Check the inside of the fuel injector insertion hole of the fuel injector pipe for foreign materials or damage.
- Be careful not to allow gasoline to contact with the fuel injector seal and the inside of the mounting hole.
- Apply liquid paraffin to the O-ring seal and install it.
- Be careful not to twist the O-ring seal.
- To prevent damage to the O-ring seal, insert the part straight along the fuel injector insertion axis without tilting it and avoid removing and inserting the part again.
- To prevent the tip of the fuel injector from bending, do not apply force to the fuel injector tip.
- Check that the tip of the fuel injector has no bend or damage.
- Make sure there is no gap between the fuel injector pipe and the fuel injector holder.
- Make sure there is no gap between the fuel injector and the fuel injector holder.



(A) Protrusion portion

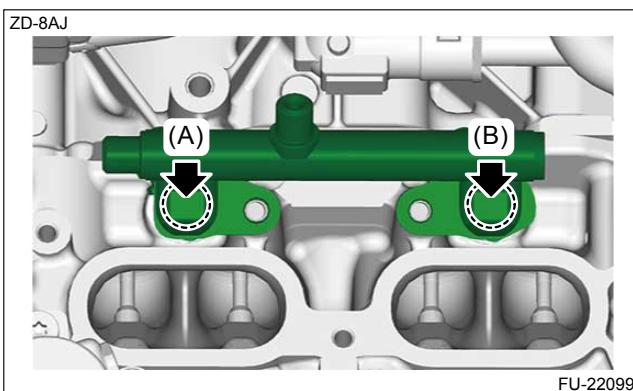
(B) Anti-rotation slot

(C) No gap allowed.

5. Insert the fuel injector pipe LH and fuel injector as a single unit into the cylinder head, and align their positions. Then, evenly press the sections (A) and (B).

Caution:

- When installing, apply liquid paraffin to the fuel injector seal.
- In order to prevent damaging the O-ring seal, do not install the fuel injector pipe and fuel injector by tilting them toward the cylinder head.

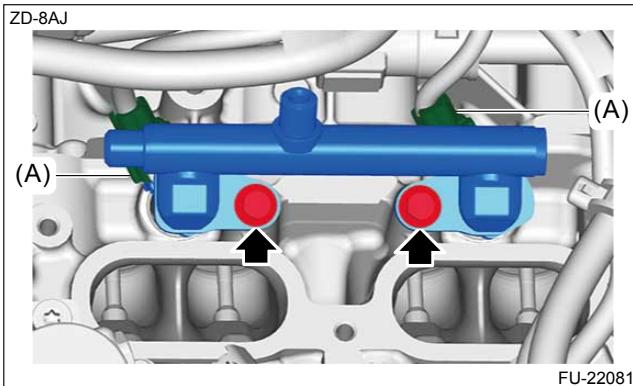


6. Tighten the bolts which hold the fuel injector pipe LH.

Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)

7. Connect the connector (A).

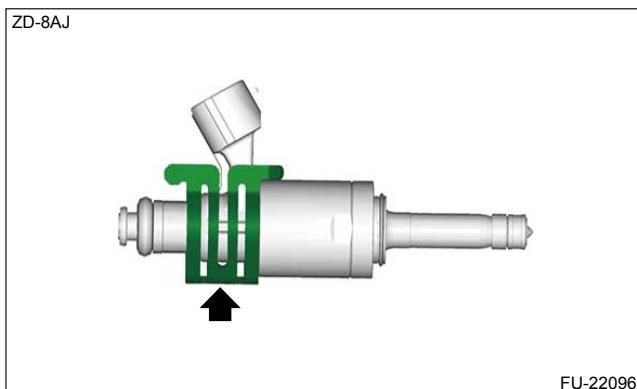


8. Install the high-pressure fuel delivery pipe. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>High Pressure Fuel Delivery Pipe>INSTALLATION > HIGH-PRESSURE FUEL DELIVERY PIPE.](#)
9. Install the high-pressure fuel delivery pipe assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>High Pressure Fuel Delivery Pipe>INSTALLATION > HIGH-PRESSURE FUEL DELIVERY PIPE ASSEMBLY.](#)
10. Install the air intake boot. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Intake Boot>INSTALLATION.](#)
11. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

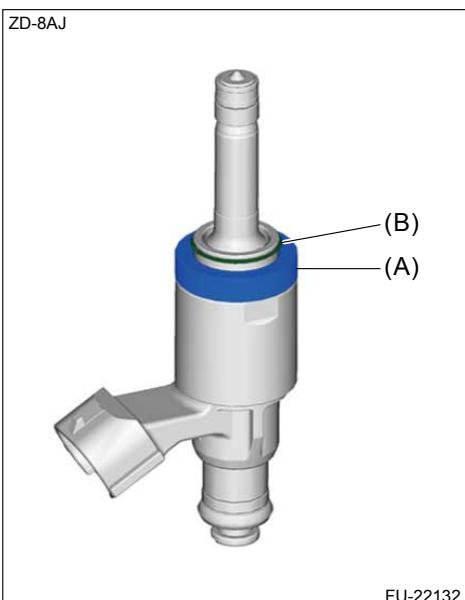
FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Injector

REPLACEMENT

1. Remove the fuel injector holder.

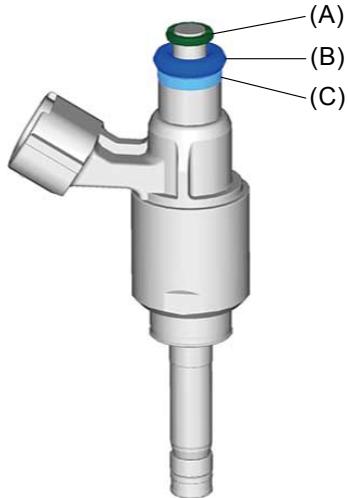


2. Remove the fuel injector ring (A) and fuel injector insulator (B).



3. Remove the stopper ring (A), O-ring seal (B) and backup ring (C).

ZD-8AJ



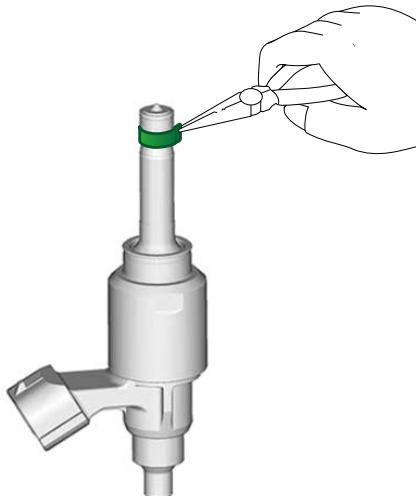
FU-22133

4. Gradually expand the fuel injector seal and remove the fuel injector seal.

Caution:

- Be careful not to apply too much force when pinching the fuel injector seal, or the fuel injector groove may be damaged.
- If the tip of the fuel injector assembly is hit or the assembly is dropped, replace the fuel injector assembly with a new part.

ZD-8AJ



FU-22134

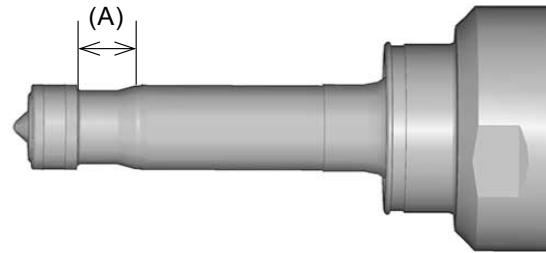
5. Install the fuel injector seal.

- (1) Remove carbon from area (A) shown in the figure (sides of fuel injector and the seal groove).

Caution:

- Do not attempt to clean the tip.
- Do not use a wire-brush.
- If the tip of the fuel injector assembly is hit or the assembly is dropped, replace the fuel injector assembly with a new part.

ZD-8AJ



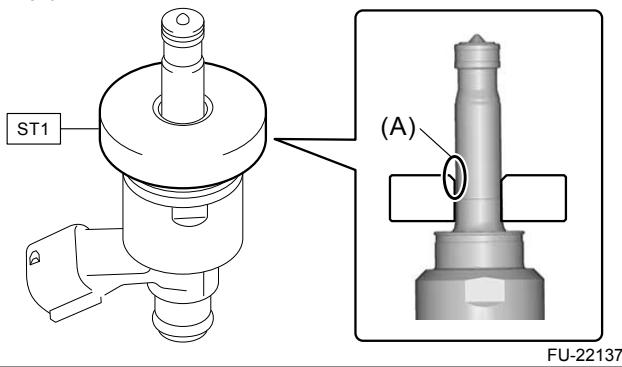
FU-22136

- (2) Set the ST1 (adjuster) on the fuel injector so that the tapered side (A) faces toward the tip of the fuel injector.

Preparation tool:

ST1: Injector Tool Set (09260-39020) (Adjuster)

ZD-8AJ



- (3) Install new fuel injector seal (A) on ST2 (guide).

Caution:

When setting the fuel injector seal on the ST2 (guide), be careful not to set it obliquely, or the seal is stretched and become hard to be fixed.

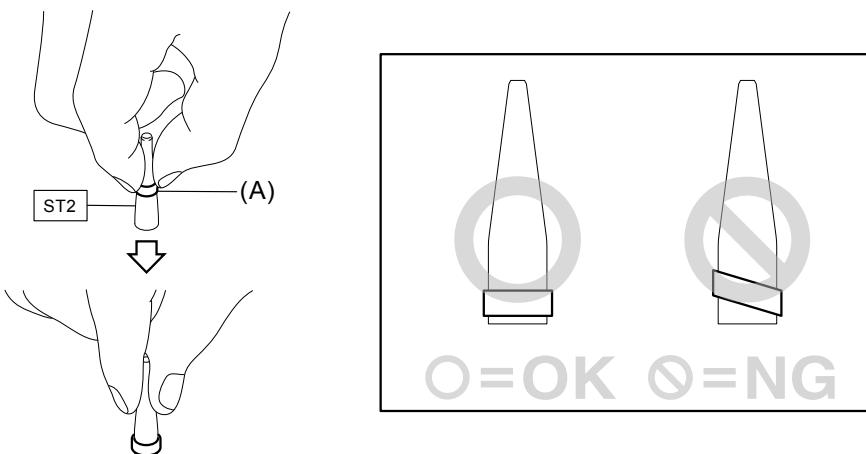
Note:

Apply liquid paraffin to the fuel injector seal.

Preparation tool:

ST2: Injector Tool Set (09260-39020) (Guide)

ZD-8AJ



FU-22138

- (4) Set the ST2 (guide) with the fuel injector seal installed on the tip of the fuel injector, and push down on the fuel injector seal with fingers and install to the fuel injector groove as shown in the figure.

Caution:

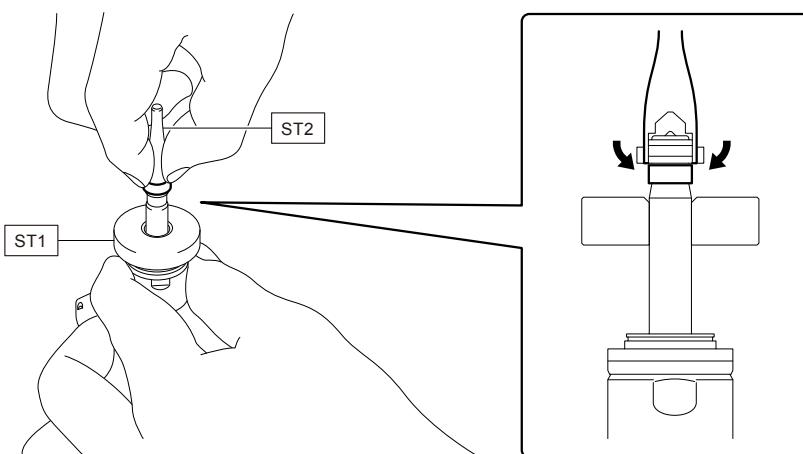
Make sure that the entire perimeter of the fuel injector seal fit in the groove.

Preparation tool:

ST1: Injector Tool Set (09260-39020) (Adjuster)

ST2: Injector Tool Set (09260-39020) (Guide)

ZD-8AJ



- (5) Slowly pull up the ST1 (adjuster) toward the tip side of fuel injector while lightly pressing down the fuel injector seal with the ST2 (guide) to make the fuel injector seal rest in the fuel injector groove.

Caution:

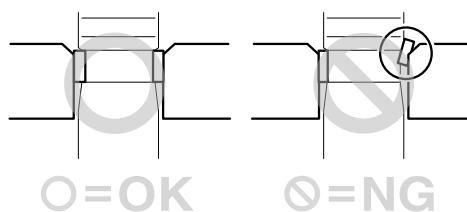
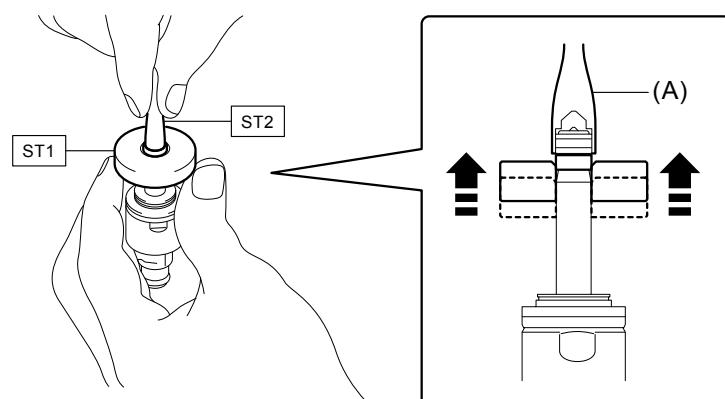
Be careful not to let the fuel injector seal get caught in the ST1 (adjuster) and the fuel injector groove. If it gets caught, replace the seal with a new part.

Preparation tool:

ST1: Injector Tool Set (09260-39020) (Adjuster)

ST2: Injector Tool Set (09260-39020) (Guide)

ZD-8AJ



FU-22140

(A) Hold

- (6) Slowly pull up the ST1 (adjuster) toward the tip side of fuel injector, and hold in position for at least 5 seconds when the fuel injector seal of the connector side reaches to the straight section of the ST1 (adjuster), and fix the condition of the fuel injector seal.

Caution:

Be careful not to let the fuel injector seal get caught in the ST1 (adjuster) and the fuel injector groove. If it gets caught, replace the seal with a new part.

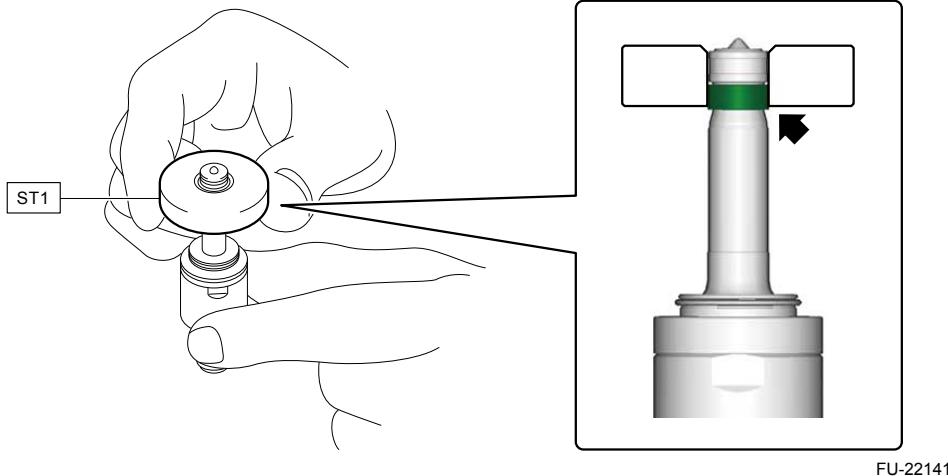
Note:

- The straight section is where the bottom end of the fuel injector seal and the bottom end of the ST1 (adjuster) meet.
- If it is hard to lift up the ST1, try to slowly lift the ST1 (adjuster) by shaking it side to side.

Preparation tool:

ST1: Injector Tool Set (09260-39020) (Adjuster)

ZD-8AJ

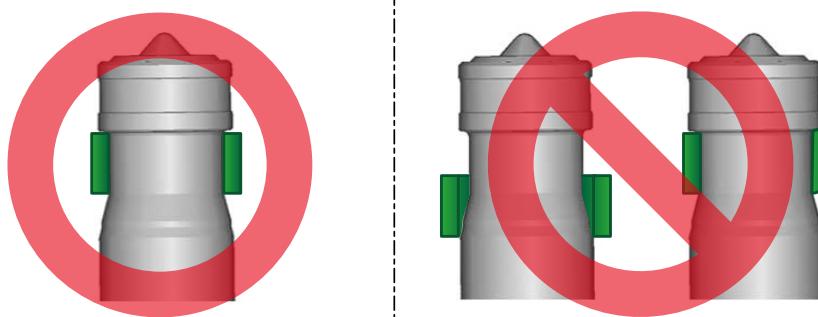


(7) After installing the fuel injector seal, check the seal for scratches, crushed area, or dislocation from the groove.

Caution:

If scratches, crushed area, or dislocation from the groove is found, replace the fuel injector seal with a new part again.

ZD-8AJ



6. Install the fuel injector assembly.

Caution:

If the tip of the fuel injector assembly is hit or the assembly is dropped, replace the fuel injector assembly with a new part.

(1) Install new backup ring, new O-ring seal and new stopper ring as shown in the figure.

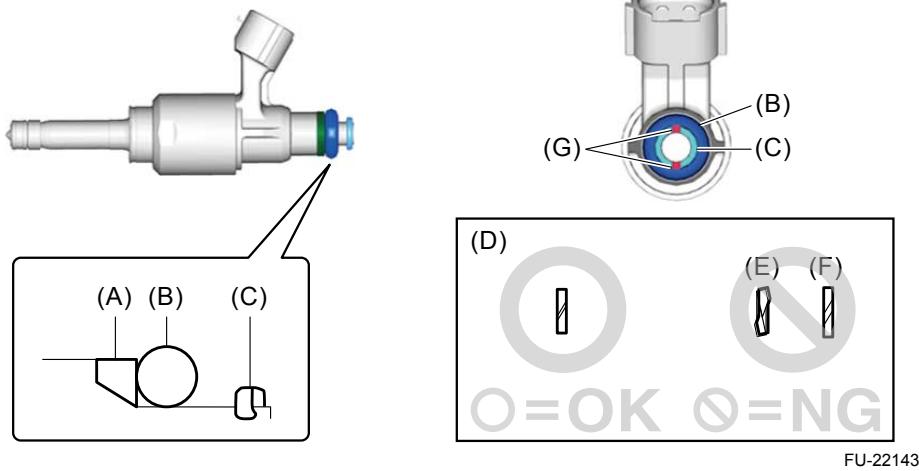
Caution:

- Check the O-ring seal groove of the fuel injector for foreign materials or damage.
- Make sure that the orientation of the back-up ring is correct.
- When installing the stopper ring, the groove should face toward the fuel injector pipe.
- Make sure that the installation order of the backup ring and O-ring seal is correct.
- There should be no expansion or ride over at the backup ring gap.
- After assembling the parts, there should be no foreign materials or damage on the fuel injector seal.

Note:

Apply liquid paraffin to the O-ring seal.

ZD-8AJ



(A) Back-up ring

(B) O-ring seal

(C) Stopper ring

(D) Back-up ring gap

(E) Ride over

(F) Expansion

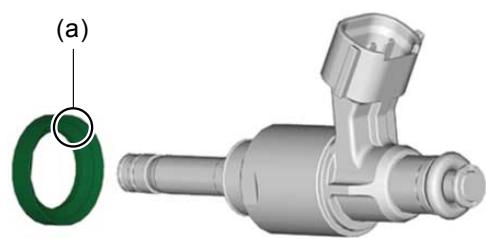
(G) Groove

(2) Install a new fuel injector insulator and new fuel injector ring.

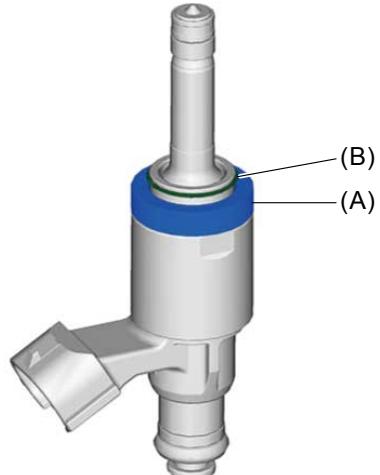
Caution:

When installing the fuel injector insulator, the groove side (a) should face toward the fuel injector.

ZD-8AJ



FU-22144



FU-22132

(A) Fuel injector insulator

(B) Fuel injector ring

7. After assembling the parts, check that there is no foreign materials or damage on the fuel injector seal.

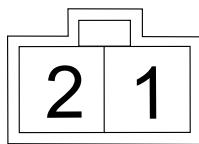
FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Injector

INSPECTION

1. Check that the fuel injector has no deformation, cracks or other damages.
2. Measure the resistance between fuel injector terminals.

Note:

This inspection can be used for judgment on short circuit or open circuit among the causes of faulty operation.



FU-20221

Terminal No.	Standard
1 — 2	Port injection side: Approx. 12 Ω (at 20°C (68°F)) Cylinder direct injection side: Approx. 1.89 Ω (at 20°C (68°F))

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Pressure Sensor

REMOVAL



Caution:

- Be careful not to spill fuel.
- Catch the fuel from the pipes using a container or cloth.

1. Disconnect the ground terminal from battery sensor. Ref. to REPAIR CONTENTS>NOTE > BATTERY.
2. Perform the steps below to remove the air intake boot, and place it aside so that it does not interfere with the work.

Caution:

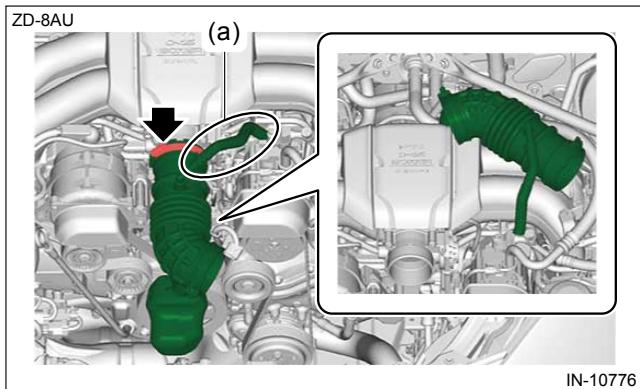
Do not disconnect the PCV hose No. 2 (a).

(1) Remove the air cleaner case. Ref. to INTAKE (INDUCTION)(H4DO)>Air Cleaner Case>REMOVAL.

(2) Loosen the clamp, remove the air intake boot, and place it aside so that it does not interfere with the work.

Caution:

Be careful not to pull out the PCV hose No. 2 (a).



3. Remove the fuel injector (cylinder direct injection side) RH. Ref. to FUEL INJECTION (FUEL SYSTEMS)(H4DO)>Fuel Injector>REMOVAL>CYLINDER DIRECT INJECTION SIDE>RH.

Note:

When replacing the fuel pressure sensor or fuel injector pipe RH, it is not necessary to remove the fuel pressure sensor from the fuel injector pipe RH as both parts are replaced with new parts.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Pressure Sensor

INSTALLATION

1. When replacing the fuel injector assembly with a new one

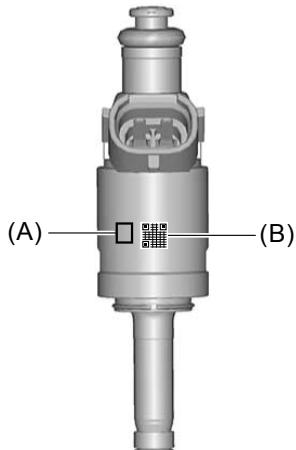
Caution:

When replacing the fuel injector assembly, select the assembly with the same flow rate stratification number.

Note:

The flow rate stratification numbers of all 4 cylinders are identical.

ZD-8AJ



FU-22135

- (A) Flow rate stratification number
(B) QR code

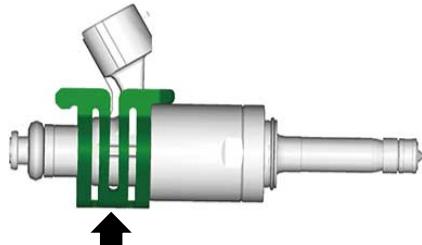
2. When reusing the fuel injector

- (1) Prepare the fuel injector assembly using the following new parts. Ref. to FUEL INJECTION (FUEL SYSTEMS)(H4DO)>Fuel Injector>REPLACEMENT.

- Stopper ring
- O-ring seal
- Back-up ring
- Fuel injector insulator
- Fuel injector ring
- Fuel injector seal

3. Install the fuel injector holder.

ZD-8AJ

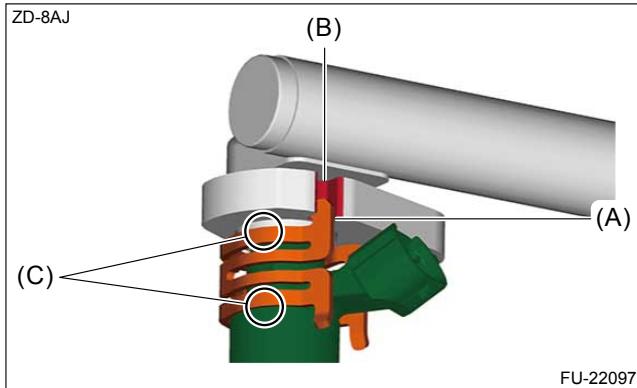


FU-22096

- 4. Align the protrusion of the fuel injector holder to the anti-rotation slot of the fuel injector pipe RH, and install the fuel injector straight to the fuel injector pipe RH.**

Caution:

- Always use a new fuel injector pipe RH.
- Degrease inside of the fuel injector insertion hole of the fuel injector pipe.
- Check the inside of the fuel injector insertion hole of the fuel injector pipe for foreign materials or damage.
- Be careful not to allow gasoline to contact with the fuel injector seal and the inside of the mounting hole.
- Apply liquid paraffin to the O-ring seal and install it.
- Be careful not to twist the O-ring seal.
- To prevent damage to the O-ring seal, insert the part straight along the fuel injector insertion axis without tilting it and avoid removing and inserting the part again.
- To prevent the tip of the fuel injector from bending, do not apply force to the fuel injector tip.
- Check that the tip of the fuel injector has no bend or damage.
- Make sure there is no gap between the fuel injector pipe and the fuel injector holder.
- Make sure there is no gap between the fuel injector and the fuel injector holder.

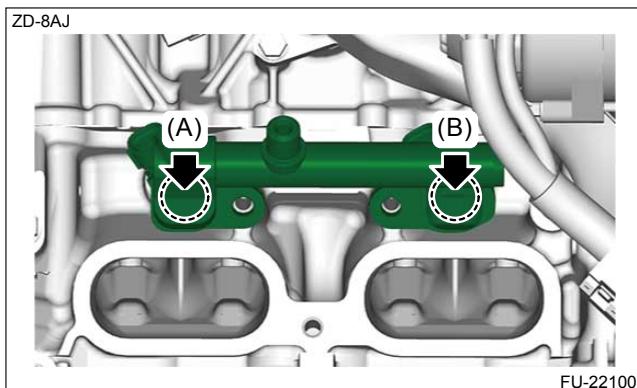


(A) Protrusion portion (B) Anti-rotation slot (C) No gap allowed.

5. Insert the fuel injector pipe RH and fuel injector as a single unit into the cylinder head, and align their positions. Then, evenly press the sections (A) and (B).

Caution:

- When installing, apply liquid paraffin to the fuel injector seal.
- In order to prevent damaging the O-ring seal, do not install the fuel injector pipe and fuel injector by tilting them toward the cylinder head.

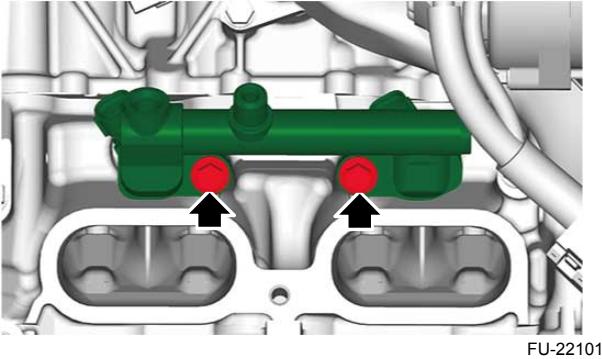


6. Tighten the bolts which hold the fuel injector pipe RH.

Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)

ZD-8AJ



FU-22101

7. Temporarily tighten the fuel pressure sensor until it cannot be turned by hand.

Caution:

Always use a new fuel pressure sensor.

8. Tighten the fuel pressure sensor.

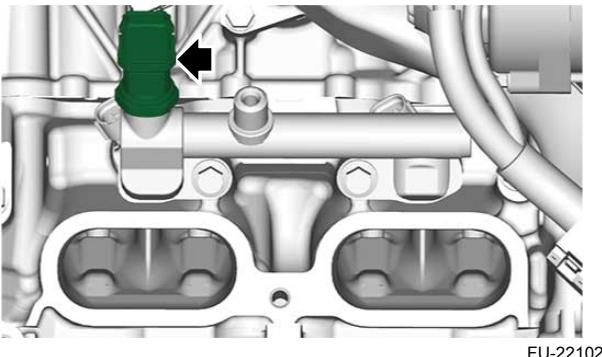
Caution:

- Be careful not to spill oil on the screw sections of the fuel pressure sensor and the fuel injector pipe RH.
- Be careful not to let foreign matter enter into the fuel pressure sensor during installation.
- The sensor should be installed perpendicularly to the fuel pressure sensor's threaded hole of the fuel injector pipe RH, and tightened to the specified torque.
- Do not recheck the tightening torque after tightening the fuel pressure sensor with specified torque.

Tightening torque:

46 N·m (4.7 kgf-m, 33.9 ft-lb)

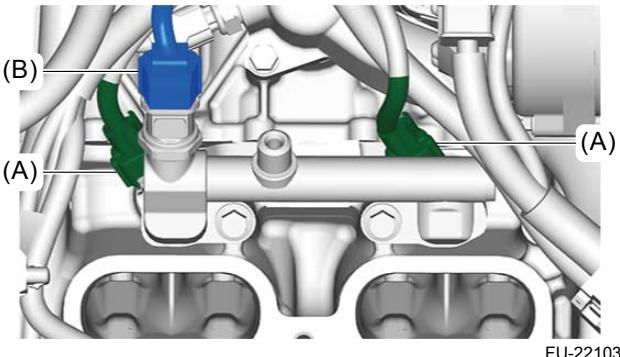
ZD-8AJ



FU-22102

9. Connect the connector (A) and connector (B).

ZD-8AJ



FU-22103

10. Install the high-pressure fuel delivery pipe assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>High Pressure Fuel Delivery Pipe>INSTALLATION > HIGH-PRESSURE FUEL DELIVERY PIPE ASSEMBLY.](#)

11. Install the air intake boot. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Intake Boot>INSTALLATION.](#)

12. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Pressure Sensor

INSPECTION

Check that the fuel pressure sensor has no deformation, cracks or other damages.

REMOVAL



1. HIGH-PRESSURE FUEL PUMP

Caution:

- Be careful not to spill fuel.
- Catch the fuel from the pipes using a container or cloth.

1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Perform the steps below to remove the air intake boot, and place it aside so that it does not interfere with the work.

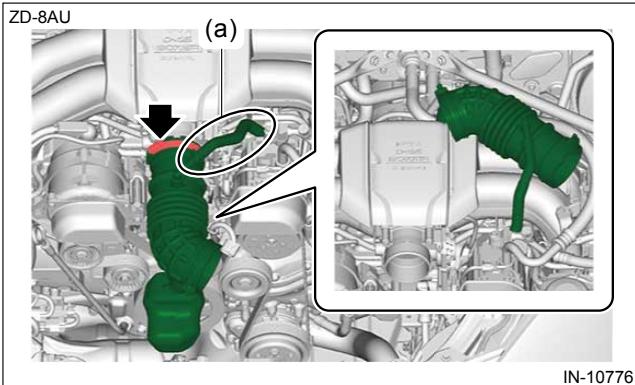
Caution:

Do not disconnect the PCV hose No. 2 (a).

- (1) Remove the air cleaner case. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Cleaner Case>REMOVAL.](#)
- (2) Loosen the clamp, remove the air intake boot, and place it aside so that it does not interfere with the work.

Caution:

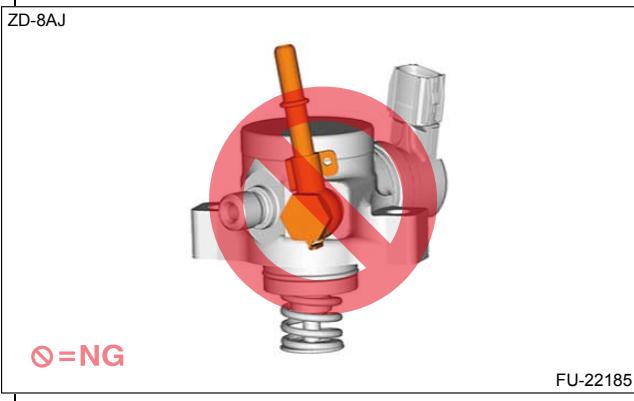
Be careful not to pull out the PCV hose No. 2 (a).



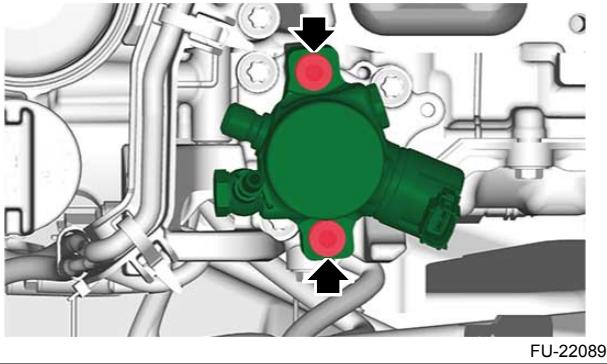
3. Remove the high-pressure fuel delivery pipes. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>High Pressure Fuel Delivery Pipe>REMOVAL > HIGH-PRESSURE FUEL DELIVERY PIPE.](#)
4. Using TORX PLUS® 40IP, remove the high-pressure fuel pump.

Caution:

Do not remove the part shown in the figure as it cannot be disassembled.



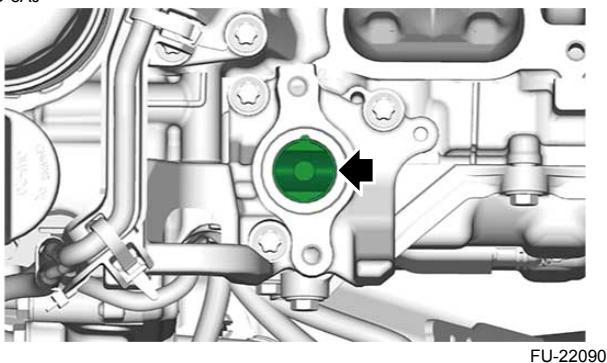
ZD-8AJ



FU-22089

5. Remove the fuel pump lifter.

ZD-8AJ

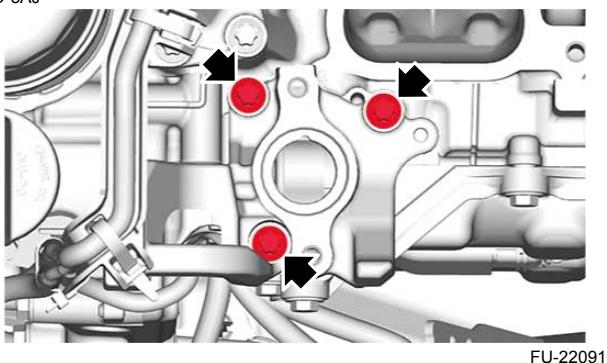


FU-22090

2. HIGH-PRESSURE FUEL PUMP CASE

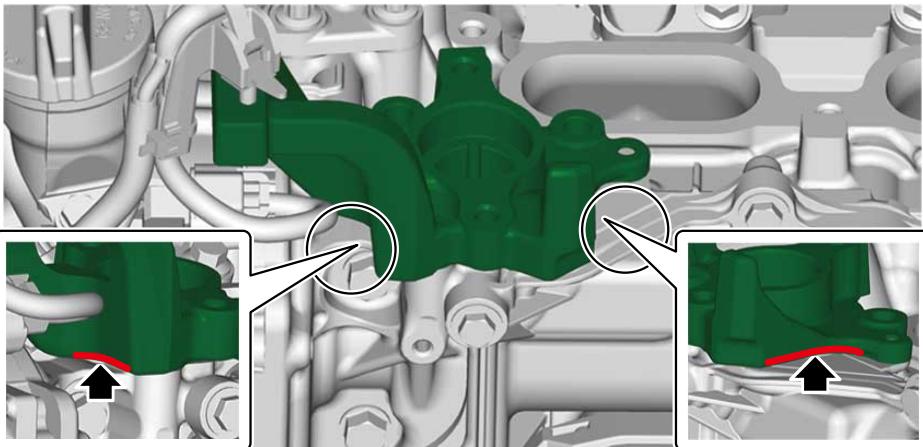
1. Remove the high-pressure fuel pump. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>High Pressure Fuel Pump>REMOVAL > HIGH-PRESSURE FUEL PUMP.](#)
2. Using TORX® E10, remove the bolts securing the high-pressure fuel pump case.

ZD-8AJ



FU-22091

3. Pry the points shown in the figure with a crowbar wrapped by protective tape, and then remove the high-pressure fuel pump case.



FU-22092

- Remove liquid gasket from the high-pressure fuel pump case and the cam carrier assembly LH.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > High Pressure Fuel Pump

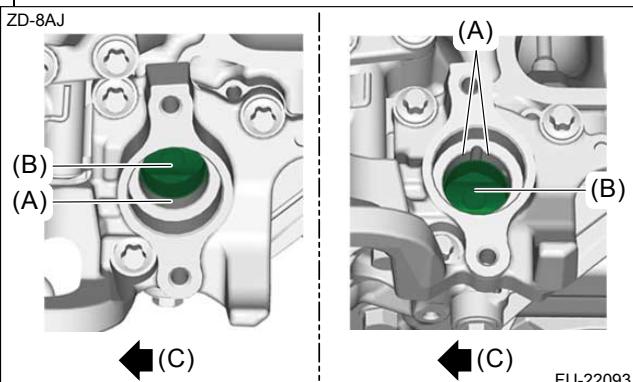
INSTALLATION

1. HIGH-PRESSURE FUEL PUMP

- Install the fuel pump lifter to the high-pressure fuel pump case.

Note:

- Apply engine oil to the side of the high-pressure fuel pump case and to the bottom surface of the fuel pump lifter.
- When applying engine oil to the bottom surface of the fuel pump lifter, drop the oil onto the roller and cam lobe through the lifter hole.



FU-22093

- (A) Application area on high-pressure fuel pump case side surface (B) Application area on fuel pump lifter bottom surface (C) Front of engine

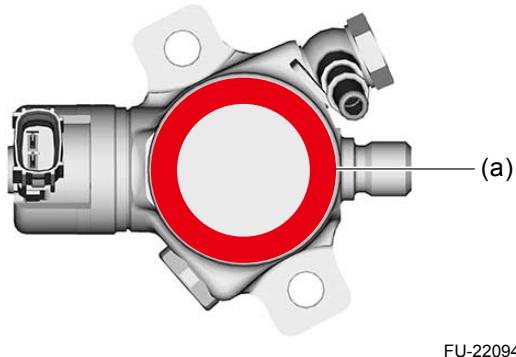
- After installing the fuel pump lifter, rotate the crankshaft in order to set the fuel pump lifter comes to the lowest position.

- Set a new O-ring and seat the high-pressure fuel pump.

Caution:

When installing the high-pressure fuel pump, press the range shown in the figure.

ZD-8AJ



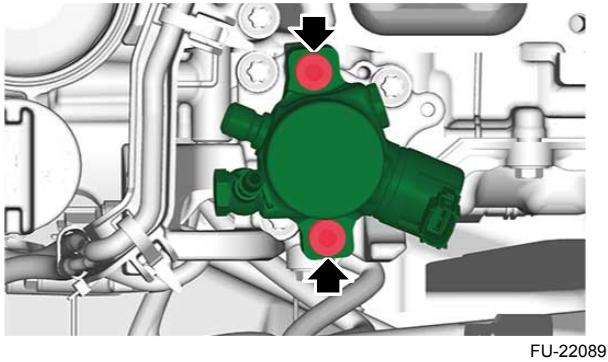
(a) Range to press

- 3.** Using TORX PLUS® 40IP, install the high-pressure fuel pump.

Tightening torque:

21 N·m (2.1 kgf-m, 15.5 ft-lb)

ZD-8AJ



4. Install the high-pressure fuel delivery pipe. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>High Pressure Fuel Delivery Pipe>INSTALLATION > HIGH-PRESSURE FUEL DELIVERY PIPE](#).
5. Install the air intake boot. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Intake Boot>INSTALLATION](#).
6. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY](#).

2. HIGH-PRESSURE FUEL PUMP CASE

1. Apply liquid gasket to the mating surfaces of fuel pump case, and install the high-pressure fuel pump case.

Caution:

After tightening the bolt, be careful not to let the liquid gasket overflow to the oil passage.

Note:

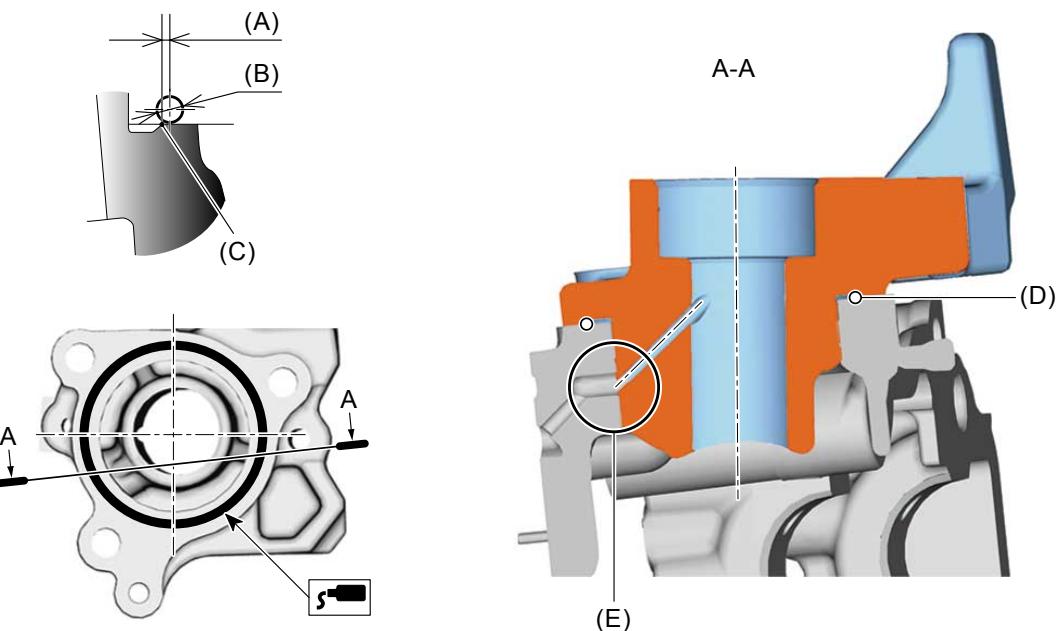
- Before applying liquid gasket, degrease the old liquid gasket seal surface of the high-pressure fuel pump case and the cam carrier assembly LH.
- Install within 5 min. after applying liquid gasket.

Preparation items:

Liquid gasket: THREE BOND 1217G (part No. K0877Y0100), 1217H or equivalent

Liquid gasket applying diameter:

3.5±1 mm (0.1378±0.0394 in)



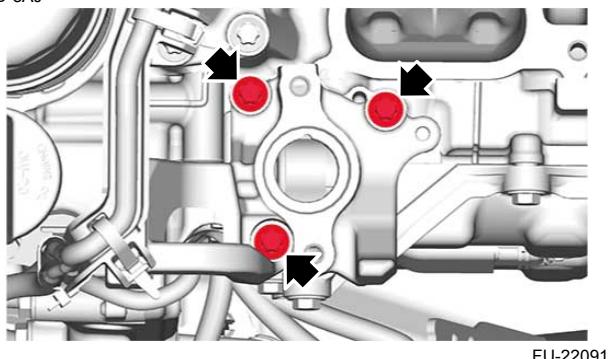
FU-22095

- (A) Within 1 mm (within 0.0394 in)
 (B) 3.5 ± 1 mm
 $(0.1378 \pm 0.0394$ in)
- (C) Chamfer edge
 (D) Liquid gasket
 (E) Oil passage

2. Using TORX® E10, install the high-pressure fuel pump case to the cam carrier assembly LH.

Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)



FU-22091

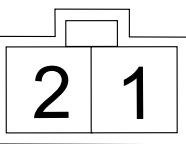
- 3.** Install the high-pressure fuel pump. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>High Pressure Fuel Pump>INSTALLATION > HIGH-PRESSURE FUEL PUMP.](#)

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > High Pressure Fuel Pump

INSPECTION

1. CHECK HIGH-PRESSURE FUEL PUMP

1. Check that the high-pressure fuel pump has no deformation, cracks or other damages.
2. Measure the resistance between high-pressure fuel pump terminals.



FU-20221

Terminal No.	Standard
1 — 2	Approx. 0.5 Ω (at 20°C (68°F))

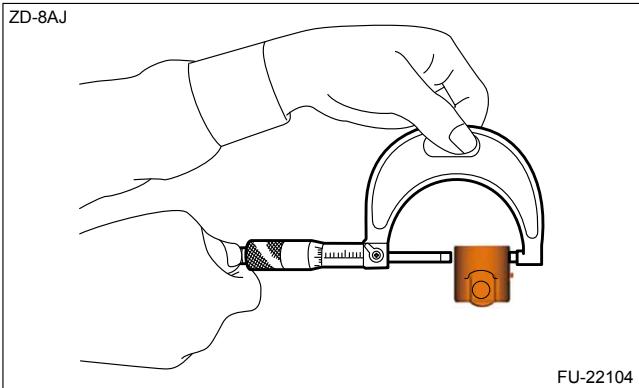
2. CHECK THE HIGH-PRESSURE FUEL PUMP CASE AND FUEL PUMP LIFTER

1. Check that the high-pressure fuel pump case and the fuel pump lifter have no deformation, cracks or other damages.
2. Check the clearance between the fuel pump lifter and high-pressure fuel pump case bore. Check the clearance between fuel pump lifter and high-pressure fuel pump case bore by measuring the outer diameter of fuel pump lifter and the inner diameter of high-pressure fuel pump case bore respectively.

(1) Measure the outer diameter of fuel pump lifter with a micrometer.

Note:

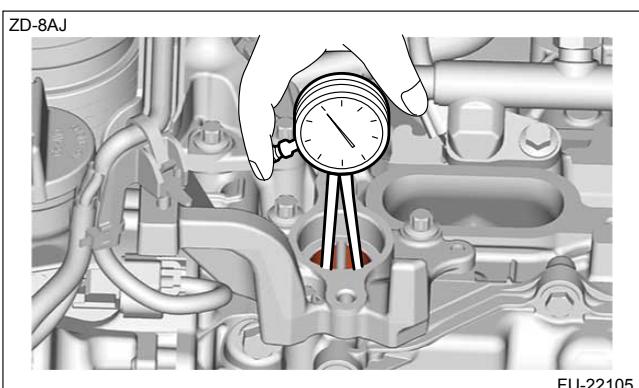
- Measurement should be performed at a temperature of 20°C (68°F).
- Measure at several points, and take notes of the value of most worn location.



(2) Using a caliper gauge, measure the inner diameter of high-pressure fuel pump case bore.

Note:

- Measurement should be performed at a temperature of 20°C (68°F).
- Measure at several points, and take notes of the value of most worn location.



(3) Calculate the clearance between the fuel pump lifter and high-pressure fuel pump case bore. If it is not within the standard, replace the fuel pump lifter and high-pressure fuel pump case as a set.

Clearance between fuel pump lifter and high-pressure fuel pump case bore:

Standard

0.067 – 0.132 mm (0.0026 – 0.0052 in)

REMOVAL



1. HIGH-PRESSURE FUEL DELIVERY PIPE

Caution:

- Be careful not to spill fuel.
- Catch the fuel from the pipes using a container or cloth.

1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Perform the steps below to remove the air intake boot, and place it aside so that it does not interfere with the work.

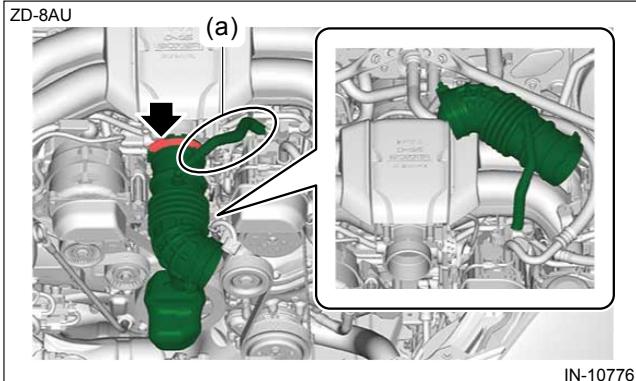
Caution:

Do not disconnect the PCV hose No. 2 (a).

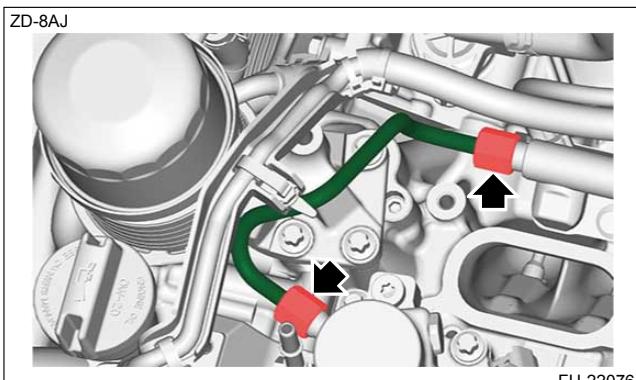
- (1) Remove the air cleaner case. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Cleaner Case>REMOVAL.](#)
- (2) Loosen the clamp, remove the air intake boot, and place it aside so that it does not interfere with the work.

Caution:

Be careful not to pull out the PCV hose No. 2 (a).



3. Remove the intake manifold assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Intake Manifold Assembly>REMOVAL.](#)
4. Remove the fuel pipe insulator No. 3. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Insulator>REMOVAL.](#)
5. Remove the high-pressure fuel delivery pipes.



2. HIGH-PRESSURE FUEL DELIVERY PIPE ASSEMBLY

Caution:

- Be careful not to spill fuel.
- Catch the fuel from the pipes using a container or cloth.

1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

- 2.** Perform the steps below to remove the air intake boot, and place it aside so that it does not interfere with the work.

Caution:

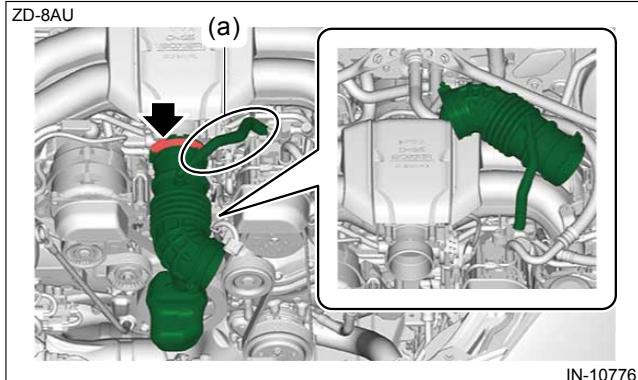
Do not disconnect the PCV hose No. 2 (a).

(1) Remove the air cleaner case. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Cleaner Case>REMOVAL.](#)

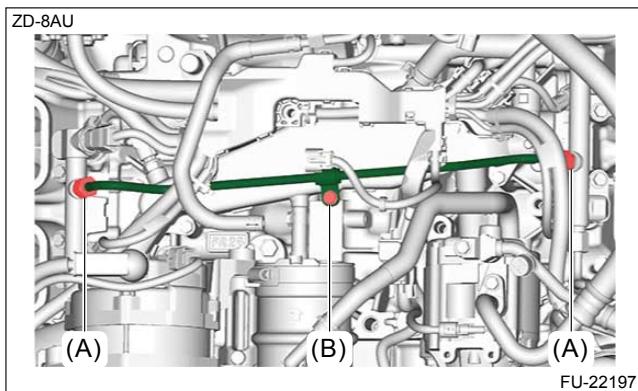
(2) Loosen the clamp, remove the air intake boot, and place it aside so that it does not interfere with the work.

Caution:

Be careful not to pull out the PCV hose No. 2 (a).



- 3.** Remove the intake manifold assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Intake Manifold Assembly>REMOVAL.](#)
- 4.** Remove the fuel pipe insulator No. 1, fuel pipe insulator No. 2 and fuel pipe insulator No. 3. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Insulator>REMOVAL.](#)
- 5.** Remove the flare nut (A) and bolt (B), and then remove the high-pressure fuel delivery pipe assembly.



FUEL INJECTION (FUEL SYSTEMS)(H4DO) > High Pressure Fuel Delivery Pipe

INSTALLATION

1. HIGH-PRESSURE FUEL DELIVERY PIPE

- 1.** Temporarily tighten the flare nut of the high-pressure fuel delivery pipe by hand until it seats, and tighten the flare nuts on both ends.

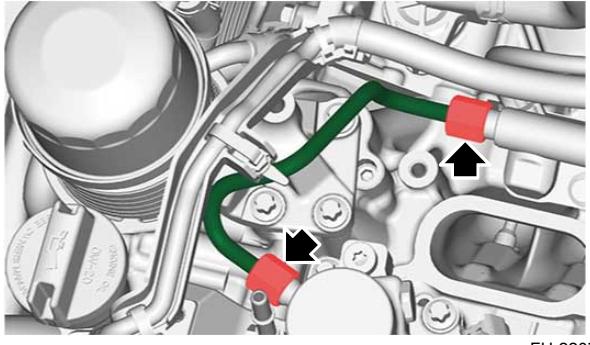
Caution:

- Always use a new high-pressure fuel delivery pipe.
- Check that the seal surface of the fuel injector pipe LH and the high-pressure fuel pump have no deformation, cracks or other damages.
- Check that the seal surface of the fuel injector pipe LH and the high-pressure fuel pump have no foreign materials.

Tightening torque:

28 N·m (2.9 kgf-m, 20.7 ft-lb)

ZD-8AJ



FU-22076

2. Install the fuel pipe insulator No. 3. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Insulator>INSTALLATION.](#)
3. Install the intake manifold assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Intake Manifold Assembly>INSTALLATION.](#)
4. Install the air intake boot. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Intake Boot>INSTALLATION.](#)
5. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

2. HIGH-PRESSURE FUEL DELIVERY PIPE ASSEMBLY

1. Install the high-pressure fuel delivery pipe assembly.

Caution:

- Always use a new high-pressure fuel delivery pipe assembly.
- Check that the seal surface of the fuel injector pipe have no deformation, cracks or other damages.
- Check that the seal surface of the fuel injector pipe have no foreign materials.

(1) Temporarily tighten the flare nut (A) to the fuel injector pipe by hand until it is seated, and secure the high-pressure fuel delivery pipe assembly to the water pipe assembly using bolts (B).

Tightening torque:

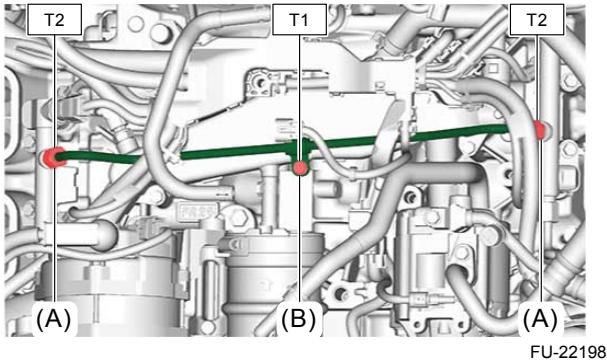
T1: 6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

(2) Tighten the flare nuts (A).

Tightening torque:

T2: 28 N·m (2.9 kgf-m, 20.7 ft-lb)

ZD-8AU



FU-22198

2. Install the fuel pipe insulator No. 1, fuel pipe insulator No. 2 and fuel pipe insulator No. 3. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Insulator>INSTALLATION.](#)
3. Install the intake manifold assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Intake Manifold Assembly>INSTALLATION.](#)
4. Install the air intake boot. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Intake Boot>INSTALLATION.](#)
5. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > High Pressure Fuel Delivery Pipe

INSPECTION

Check that the high-pressure fuel delivery pipe and the high-pressure fuel delivery pipe assembly have no deformation, cracks and other damages.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Engine Wiring Harness

REMOVAL

1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Perform the steps below to remove the air intake boot, and place it aside so that it does not interfere with the work.

Caution:

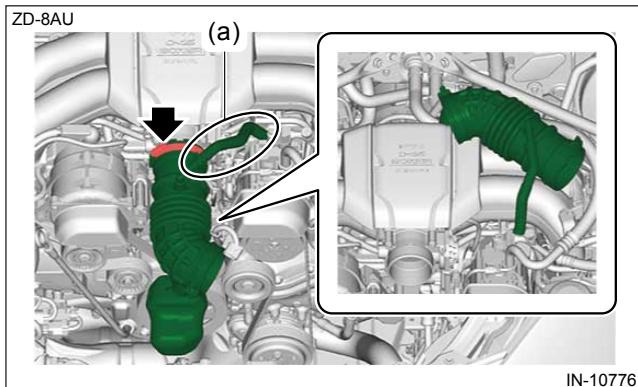
Do not disconnect the PCV hose No. 2 (a).

(1) Remove the air cleaner case. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Cleaner Case>REMOVAL.](#)

(2) Loosen the clamp, remove the air intake boot, and place it aside so that it does not interfere with the work.

Caution:

Be careful not to pull out the PCV hose No. 2 (a).

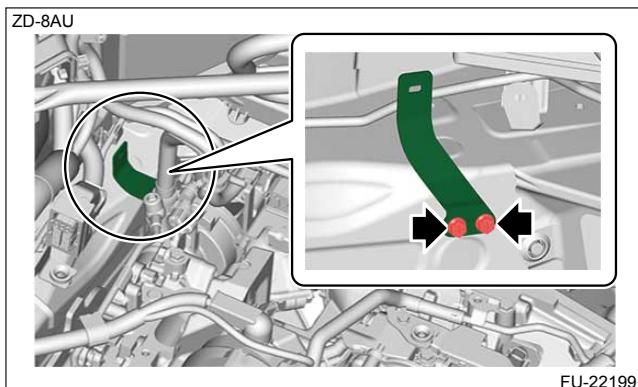


IN-10776

3. Remove the intake manifold assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Intake Manifold Assembly>REMOVAL.](#)
4. Disconnect each connector to remove the engine wiring harness. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>General Description>COMPONENT > ENGINE WIRING HARNESS.](#)
5. Remove the engine wiring harness stay.

Note:

Perform this procedure only when required.



FU-22199

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Engine Wiring Harness

INSTALLATION

1. Install the engine wiring harness stay.

Tightening torque:

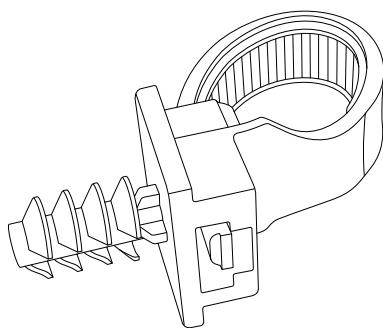
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

2. Set the engine wiring harness to the engine, and connect each connector. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>General Description>COMPONENT > ENGINE WIRING HARNESS.](#)

Note:

- When the clip shown in the figure is removed, replace it with a new part.

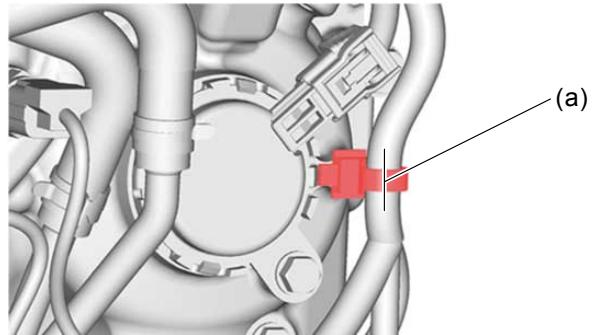
SK-5CJ



FU-21853

- Before replacing the clip, put an alignment mark (a) on both engine wiring harness and clip to remove the clip, and then align to the alignment mark (a) to attach a new clip to the engine wiring harness.

ZD-8AJ



FU-22168

3. Install the intake manifold assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Intake Manifold Assembly>INSTALLATION.](#)
4. Install the air intake boot. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Intake Boot>INSTALLATION.](#)
5. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Engine Wiring Harness

INSPECTION

Check that the engine wiring harness does not have deformation, cracks and any other damage.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Engine Coolant Temperature Sensor

REMOVAL



1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Drain engine coolant. [Ref. to COOLING\(H4DO\)>Engine Coolant>REPLACEMENT > DRAINING OF ENGINE COOLANT.](#)
3. Perform the steps below to remove the air intake boot, and place it aside so that it does not interfere with the work.

Caution:

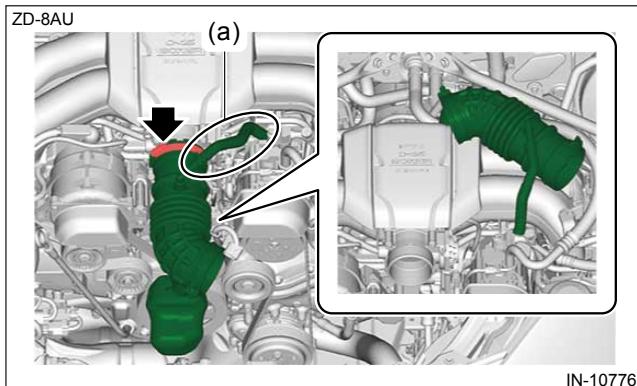
Do not disconnect the PCV hose No. 2 (a).

(1) Remove the air cleaner case. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Cleaner Case>REMOVAL.](#)

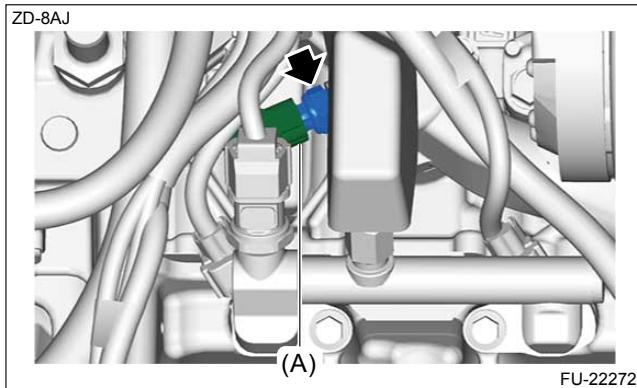
(2) Loosen the clamp, remove the air intake boot, and place it aside so that it does not interfere with the work.

Caution:

Be careful not to pull out the PCV hose No. 2 (a).



4. Remove the fuel pipe insulator No. 1. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Insulator>REMOVAL.](#)
5. Disconnect the connector (A) and remove the engine coolant temperature sensor.



FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Engine Coolant Temperature Sensor

INSTALLATION

1. Place a new gasket and install the engine coolant temperature sensor.

Tightening torque:

16 N·m (1.6 kgf-m, 11.8 ft-lb)

2. Connect the connector.

3. Install the fuel pipe insulator No. 1. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Insulator>INSTALLATION.](#)

4. Install the air intake boot. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Intake Boot>INSTALLATION.](#)

5. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

6. Fill engine coolant. [Ref. to COOLING\(H4DO\)>Engine Coolant>REPLACEMENT > FILLING OF ENGINE COOLANT.](#)

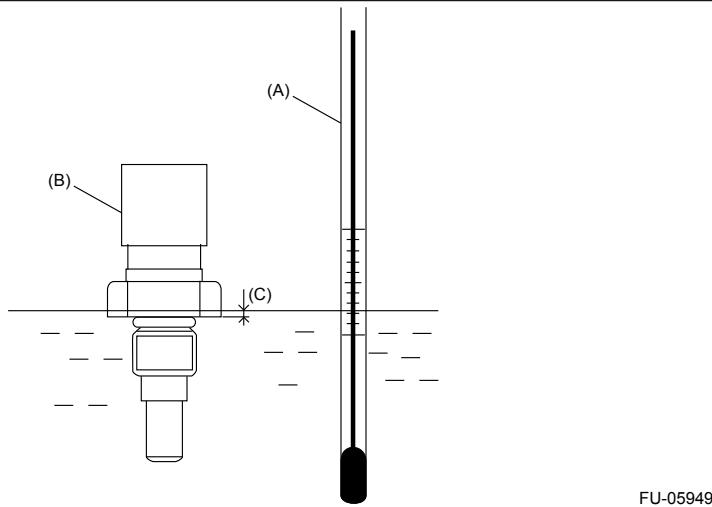
FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Engine Coolant Temperature Sensor

INSPECTION

1. Check that the engine coolant temperature sensor has no deformation, cracks or other damages.
2. Immerse the engine coolant temperature sensor and a thermometer in water.

Caution:

Take care not to allow water to get into the engine coolant temperature sensor connector. Completely remove any water inside.

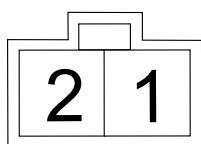


(A) Thermometer (B) Engine coolant temperature sensor (C) Hexagonal part height: To approx. $\frac{1}{3}$

3. Raise water temperature gradually, measure the resistance between the engine coolant temperature sensor terminals when the temperature is 20°C (68°F) and 80°C (176°F).

Note:

Agitate the water for even temperature distribution.



FU-20221

Water temperature	Terminal No.	Standard
20°C (68°F)	1 — 2	2.25 — 2.65 kΩ
80°C (176°F)		0.305 — 0.331 kΩ

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Engine Oil Temperature Sensor

REMOVAL

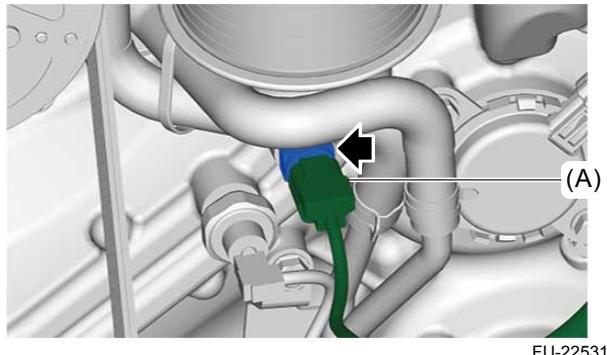


Caution:

If the engine oil is spilt over exhaust pipe or the under cover, wipe it off with cloth to avoid emission of smoke or causing a fire.

1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Remove the air cleaner case. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Cleaner Case>REMOVAL.](#)
3. Disconnect the connector (A) and remove the engine oil temperature sensor.

ZD-8BJ



FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Engine Oil Temperature Sensor

INSTALLATION

1. Place a new gasket and install the engine oil temperature sensor.

Tightening torque:

16 N·m (1.6 kgf-m, 11.8 ft-lb)

2. Connect the connector.

3. Install the air cleaner case. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Cleaner Case>INSTALLATION.](#)

4. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Engine Oil Temperature Sensor

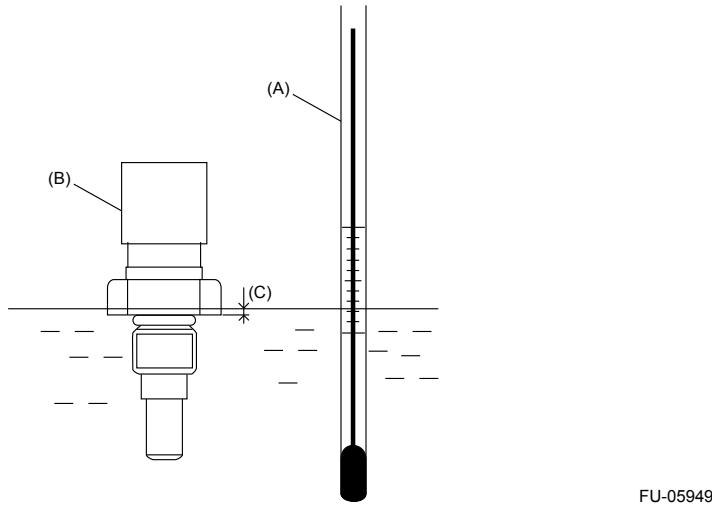
INSPECTION

1. Check that the engine oil temperature sensor has no deformation, cracks or other damages.

2. Immerse the engine oil temperature sensor and a thermometer in water.

Caution:

Take care not to allow water to get into the engine oil temperature sensor connector. Completely remove any water inside.

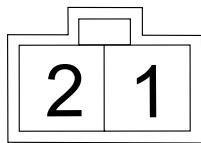


(A) Thermometer (B) Engine oil temperature sensor (C) Hexagonal part height: To approx. $\frac{1}{3}$

- 3.** Raise water temperature gradually, measure the resistance between the engine oil temperature sensor terminals when the temperature is 20°C (68°F) and 80°C (176°F).

Note:

Agitate the water for even temperature distribution.



FU-20221

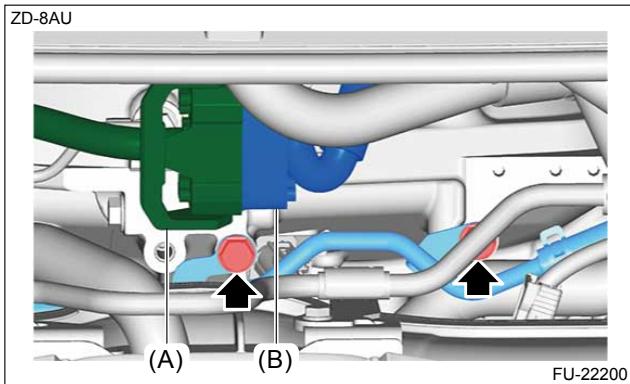
Water temperature	Terminal No.	Standard
20°C (68°F)	1 — 2	2.25 — 2.65 kΩ
80°C (176°F)		0.305 — 0.331 kΩ

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Crankshaft Position Sensor

REMOVAL



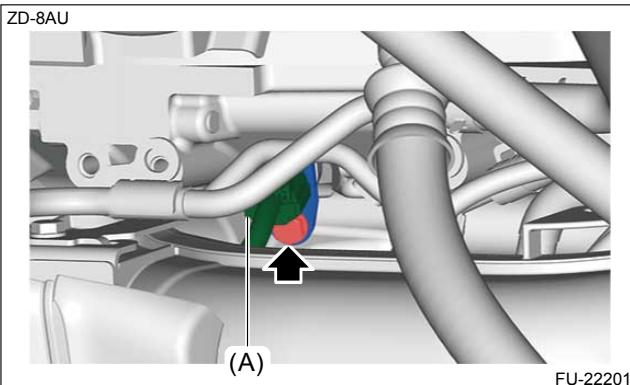
1. Disconnect the ground terminal from battery sensor. Ref. to REPAIR CONTENTS>NOTE > BATTERY.
2. Disconnect the connector (A) and remove the transmission harness (B) from the ATF cooler pipe. (AT model)
3. Remove the bolt securing the preheater pipe.



4. Disconnect the connector (A) and remove the crankshaft position sensor.

Caution:

To prevent the preheater hose from being damaged or loose, pay careful attention while moving the preheater pipe.



FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Crankshaft Position Sensor

INSTALLATION

1. Install the crankshaft position sensor with new O-ring.

Note:

Apply engine oil to O-ring.

Tightening torque:

6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

2. Secure the preheater pipe with the bolt.

Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)

3. Install the transmission harness to the ATF cooler pipe, and connect the connector. (AT model)

4. Connect the ground terminal to battery sensor. Ref. to REPAIR CONTENTS>NOTE > BATTERY.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Crankshaft Position Sensor

INSPECTION

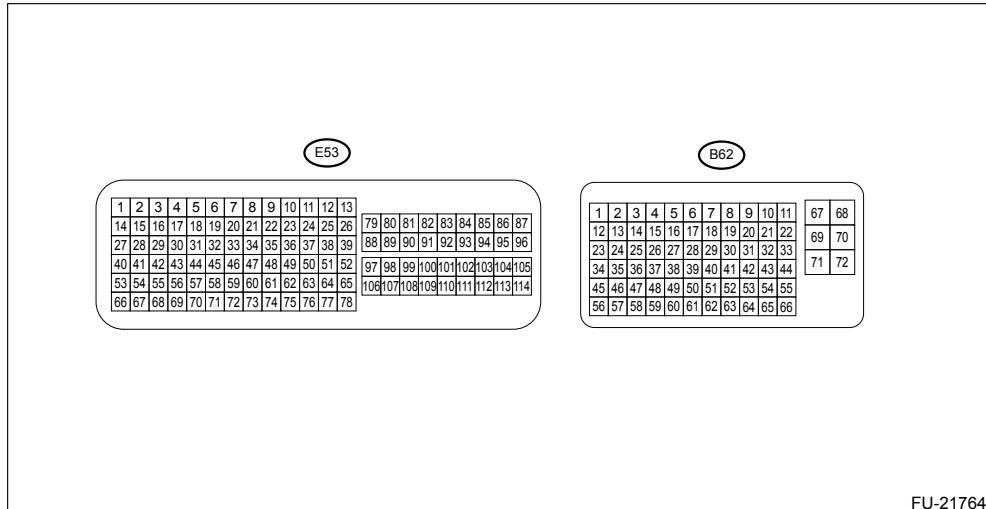
1. CRANKSHAFT POSITION SENSOR

1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Prepare an oscilloscope.
3. Disconnect the connector from ECM. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Engine Control Module \(ECM\)>REMOVAL.](#)
4. Attach the ST between the ECM, engine wiring harness and the bulkhead wiring harness. [Ref. to ENGINE \(DIAGNOSTICS\) \(H4DO\)>General Description>PREPARATION TOOL > HOW TO USE CHECK BOARD.](#)

Special tool:

CHECK BOARD (18460AA180)

5. Connect the probe to ST.



Terminal No.	Probe
(E53) No. 66	+
(B62) No. 69	-

6. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
7. Start the engine and let it idle.
8. Check the waveforms and voltage.

Note:

For waveform and voltage, refer to "Control Module I/O Signal". [Ref. to ENGINE \(DIAGNOSTICS\) \(H4DO\)>Control Module I/O Signal.](#)

9. After inspection, install the related parts in the reverse order of removal.

Note:

For installation procedures of ECM connectors, refer to Engine Control Module (ECM). [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Engine Control Module \(ECM\)>INSTALLATION.](#)

2. OTHER INSPECTIONS

Check that the crankshaft position sensor has no deformation, cracks or other damages.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Crankshaft Position Sensor Plate

REMOVAL

The crankshaft position sensor plate is tightened together with the drive plate or flywheel; therefore, refer to "Drive Plate" or "Flywheel" for removal procedure.

Drive plate:

 [Ref. to AUTOMATIC TRANSMISSION>Drive Plate>REMOVAL.](#)

Flywheel:

 [Ref. to CLUTCH SYSTEM>Flywheel>REMOVAL.](#)

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Crankshaft Position Sensor Plate

INSTALLATION

The crankshaft position sensor plate is tightened together with the drive plate or flywheel; therefore, refer to "Drive Plate" or "Flywheel" for installation procedure.

Drive plate:

 [Ref. to AUTOMATIC TRANSMISSION>Drive Plate>INSTALLATION.](#)

Flywheel:

 [Ref. to CLUTCH SYSTEM>Flywheel>INSTALLATION.](#)

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Crankshaft Position Sensor Plate

INSPECTION

Check that the crankshaft position sensor plate has no deformation, cracks or other damages.

REMOVAL



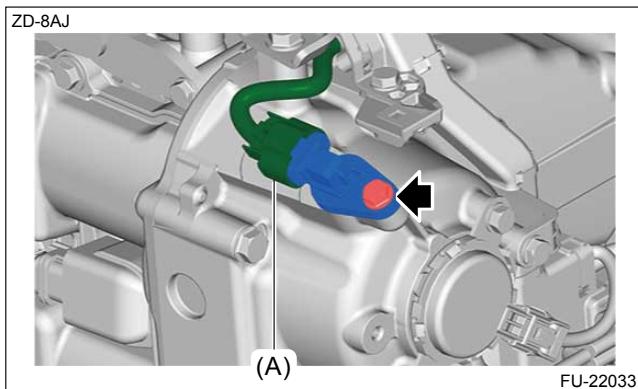
Caution:

If the engine oil is spilt over exhaust pipe or the under cover, wipe it off with cloth to avoid emission of smoke or causing a fire.

1. INTAKE

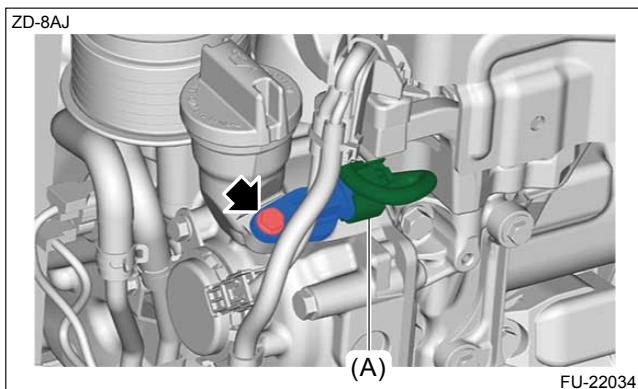
• RH SIDE

1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Disconnect the connector (A) and remove the camshaft position sensor.



• LH SIDE

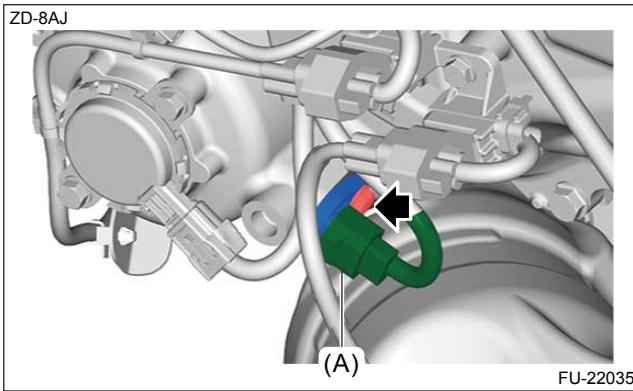
1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Disconnect the connector (A) and remove the camshaft position sensor.



2. EXHAUST

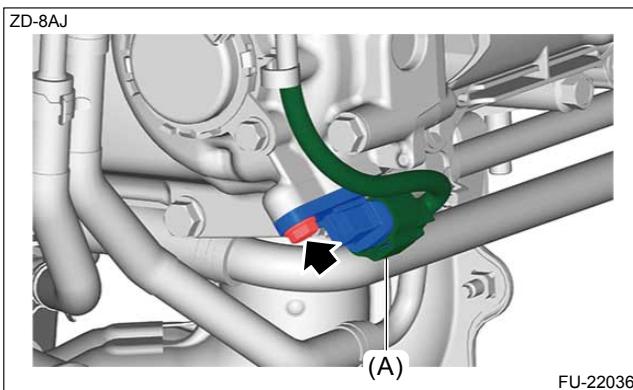
• RH SIDE

1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Remove the air cleaner case. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Cleaner Case>REMOVAL.](#)
3. Disconnect the connector (A) and remove the camshaft position sensor.



• **LH SIDE**

1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Remove the air cleaner case. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Cleaner Case>REMOVAL.](#)
3. Disconnect the connector (A) and remove the camshaft position sensor.



FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Camshaft Position Sensor

INSTALLATION

1. INTAKE

• **RH SIDE**

1. Install the camshaft position sensor with new O-ring.

Note:

Apply engine oil to O-ring.

Tightening torque:

6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

2. Connect the connector.

3. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

• **LH SIDE**

1. Install the camshaft position sensor with new O-ring.

Note:

Apply engine oil to O-ring.

Tightening torque:

6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

2. Connect the connector.

3. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

2. EXHAUST

• **RH SIDE**

1. Install the camshaft position sensor with new O-ring.

Note:

Apply engine oil to O-ring.

Tightening torque:

6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

2. Connect the connector.
3. Install the air cleaner case. Ref. to INTAKE (INDUCTION)(H4DO)>Air Cleaner Case>INSTALLATION.
4. Connect the ground terminal to battery sensor. Ref. to REPAIR CONTENTS>NOTE > BATTERY.

• LH SIDE

1. Install the camshaft position sensor with new O-ring.

Note:

Apply engine oil to O-ring.

Tightening torque:

6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

2. Connect the connector.
3. Install the air cleaner case. Ref. to INTAKE (INDUCTION)(H4DO)>Air Cleaner Case>INSTALLATION.
4. Connect the ground terminal to battery sensor. Ref. to REPAIR CONTENTS>NOTE > BATTERY.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Camshaft Position Sensor

INSPECTION

1. CAMSHAFT POSITION SENSOR

1. Disconnect the ground terminal from battery sensor. Ref. to REPAIR CONTENTS>NOTE > BATTERY.
2. Prepare an oscilloscope.
3. Disconnect the connector from ECM. Ref. to FUEL INJECTION (FUEL SYSTEMS)(H4DO)>Engine Control Module (ECM)>REMOVAL.
4. Attach the ST between the ECM, engine harness and the bulkhead wiring harness. Ref. to ENGINE (DIAGNOSTICS)(H4DO)>General Description>PREPARATION TOOL > HOW TO USE CHECK BOARD.

Special tool:

CHECK BOARD (18460AA180)

5. Connect the probe to ST.

E53

B62

1	2	3	4	5	6	7	8	9	10	11	12	13
14	15	16	17	18	19	20	21	22	23	24	25	26
27	28	29	30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49	50	51	52
53	54	55	56	57	58	59	60	61	62	63	64	65
66	67	68	69	70	71	72	73	74	75	76	77	78

1	2	3	4	5	6	7	8	9	10	11	67	68
12	13	14	15	16	17	18	19	20	21	22	69	70
23	24	25	26	27	28	29	30	31	32	33	71	72
34	35	36	37	38	39	40	41	42	43	44		
45	46	47	48	49	50	51	52	53	54	55		
56	57	58	59	60	61	62	63	64	65	66		

FU-21764

Camshaft position sensor	Terminal No.	Probe
Intake	RH (E53) No. 78	+
	LH (E53) No. 77	+
Exhaust	RH (E53) No. 65	+
	LH (E53) No. 64	+
RH and LH	(B62) No. 69	-

6. Connect the ground terminal to battery sensor.  [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
7. Start the engine and let it idle.
8. Check the waveforms and voltage.

Note:

For waveform and voltage, refer to "Control Module I/O Signal".  [Ref. to ENGINE \(DIAGNOSTICS\) \(H4DO\)>Control Module I/O Signal.](#)

9. After inspection, install the related parts in the reverse order of removal.

Note:

For installation procedures of ECM connectors, refer to Engine Control Module (ECM).  [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Engine Control Module \(ECM\)>INSTALLATION.](#)

2. OTHER INSPECTIONS

Check that the camshaft position sensor has no deformation, cracks or other damages.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Oil Control Solenoid

REMOVAL



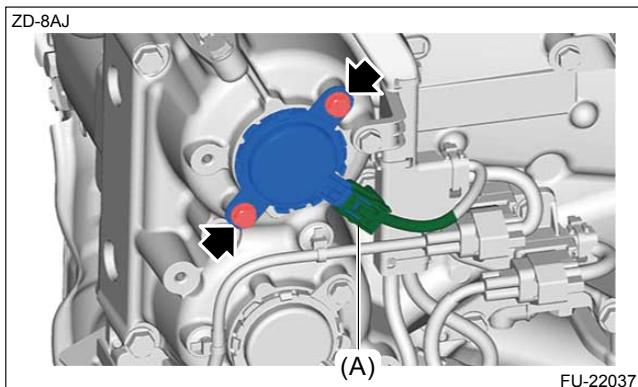
Caution:

If the engine oil is spilt over exhaust pipe or the under cover, wipe it off with cloth to avoid emission of smoke or causing a fire.

1. INTAKE

• RH SIDE

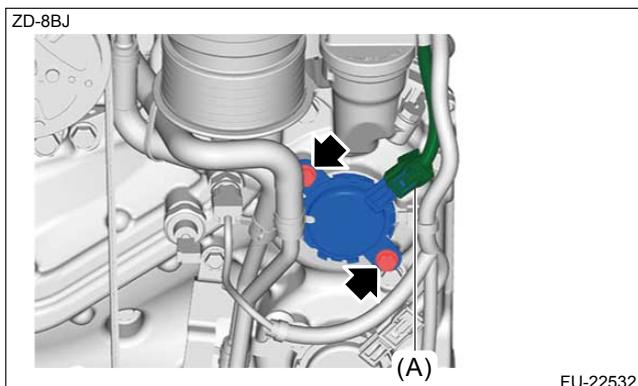
1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Disconnect the connector (A) and remove the oil control solenoid.



3. Remove the O-ring and back-up ring from the oil control solenoid.

• LH SIDE

1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Disconnect the connector (A) and remove the oil control solenoid.



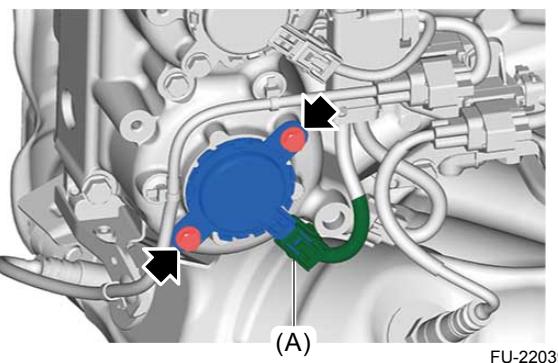
3. Remove the O-ring and back-up ring from the oil control solenoid.

2. EXHAUST

• RH SIDE

1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Disconnect the connector (A) and remove the oil control solenoid.

ZD-8AJ

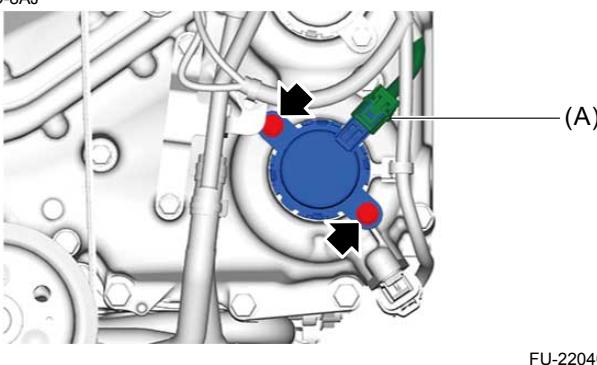


- 3.** Remove the O-ring and back-up ring from the oil control solenoid.

• **LH SIDE**

- 1.** Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
- 2.** Disconnect the connector (A) and remove the oil control solenoid.

ZD-8AJ



- 3.** Remove the O-ring and back-up ring from the oil control solenoid.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Oil Control Solenoid

INSTALLATION

1. INTAKE

• **RH SIDE**

- 1.** Install the backup ring to the oil control solenoid.
- 2.** Using a new O-ring, install the oil control solenoid.

Note:

Apply engine oil to O-ring.

Tightening torque:

6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

- 3.** Connect the connector.
- 4.** Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

• **LH SIDE**

- 1.** Install the backup ring to the oil control solenoid.
- 2.** Using a new O-ring, install the oil control solenoid.

Note:

Apply engine oil to O-ring.

Tightening torque:

6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

- 3.** Connect the connector.
- 4.** Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

2. EXHAUST SIDE

• RH SIDE

1. Install the backup ring to the oil control solenoid.
2. Using a new O-ring, install the oil control solenoid.

Note:

Apply engine oil to O-ring.

Tightening torque:

6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

3. Connect the connector.

4. Connect the ground terminal to battery sensor.  Ref. to REPAIR CONTENTS>NOTE > BATTERY.

• LH SIDE

1. Install the backup ring to the oil control solenoid.
2. Using a new O-ring, install the oil control solenoid.

Note:

Apply engine oil to O-ring.

Tightening torque:

6.4 N·m (0.7 kgf-m, 4.7 ft-lb)

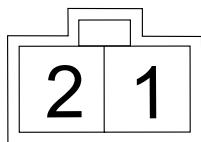
3. Connect the connector.

4. Connect the ground terminal to battery sensor.  Ref. to REPAIR CONTENTS>NOTE > BATTERY.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Oil Control Solenoid

INSPECTION

1. Check that the oil control solenoid has no deformation, cracks or other damages.
2. Measure the resistance between the oil control solenoid terminals.



FU-20221

Terminal No.	Standard
1 – 2	6.85 – 7.65 Ω (at 20°C (68°F))

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Knock Sensor

REMOVAL

1. RH SIDE

1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Perform the steps below to remove the air intake boot, and place it aside so that it does not interfere with the work.

Caution:

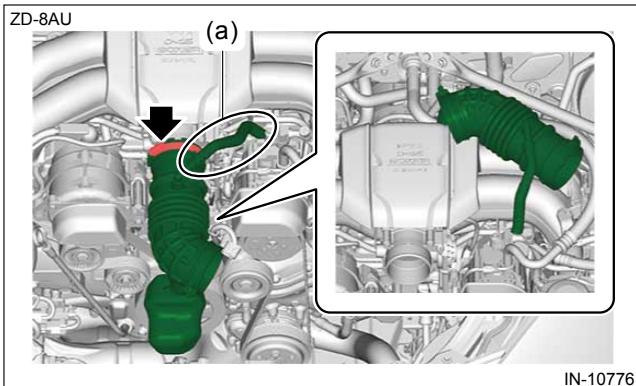
Do not disconnect the PCV hose No. 2 (a).

(1) Remove the air cleaner case. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Cleaner Case>REMOVAL.](#)

(2) Loosen the clamp, remove the air intake boot, and place it aside so that it does not interfere with the work.

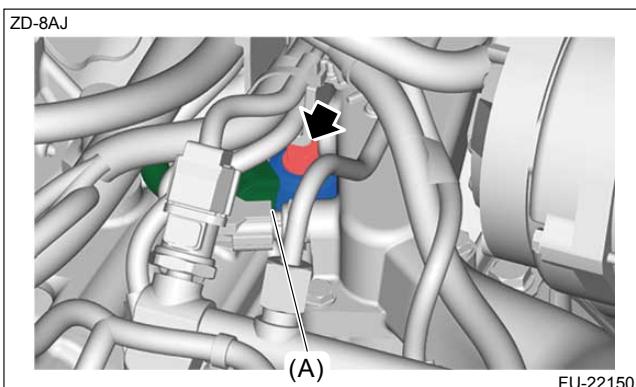
Caution:

Be careful not to pull out the PCV hose No. 2 (a).



IN-10776

3. Remove the fuel pipe insulator No. 1 and fuel pipe insulator No. 2. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Insulator>REMOVAL.](#)
4. Disconnect the connector (A) and remove the knock sensor.



FU-22150

2. LH SIDE

1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Perform the steps below to remove the air intake boot, and place it aside so that it does not interfere with the work.

Caution:

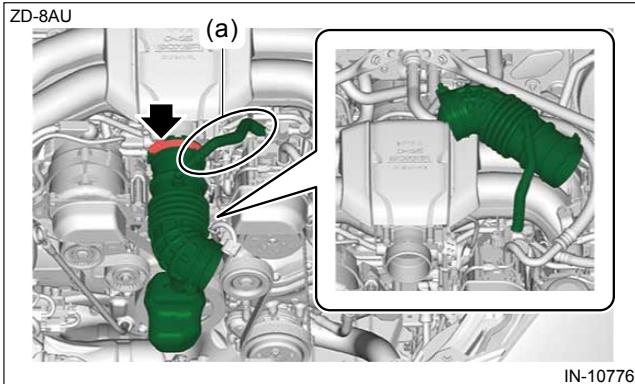
Do not disconnect the PCV hose No. 2 (a).

(1) Remove the air cleaner case. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Cleaner Case>REMOVAL.](#)

(2) Loosen the clamp, remove the air intake boot, and place it aside so that it does not interfere with the work.

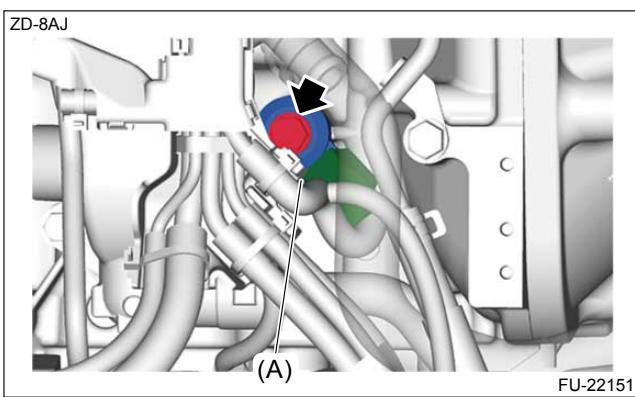
Caution:

Be careful not to pull out the PCV hose No. 2 (a).



3. Remove the fuel pipe insulator No. 1 and fuel pipe insulator No. 2. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Insulator>REMOVAL.](#)

4. Disconnect the connector (A) and remove the knock sensor.



FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Knock Sensor

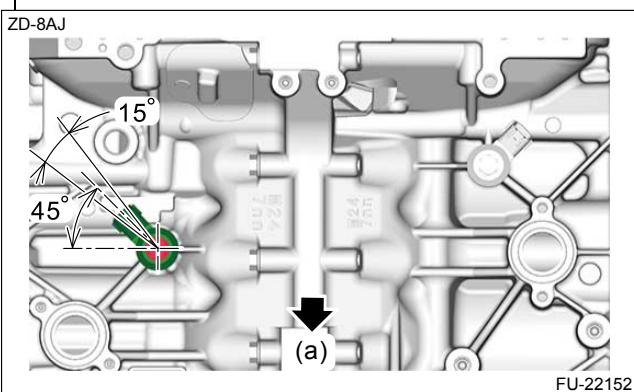
INSTALLATION

1. RH SIDE

1. Install the knock sensor and connect the connector.

Note:

- Knock sensor must be positioned so that the connector center comes within the range shown in the figure.
- Make sure that the knock sensor and its connector do not touch the adjacent parts.



(a) Front of engine

Tightening torque:

24 N·m (2.4 kgf-m, 17.7 ft-lb)

2. Install the fuel pipe insulator No. 1 and fuel pipe insulator No. 2. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Insulator>INSTALLATION.](#)

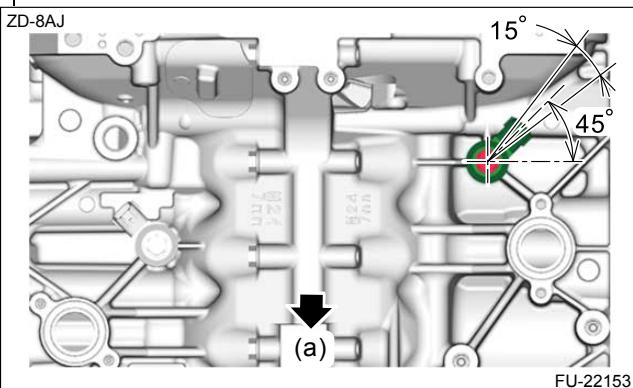
3. Install the air intake boot. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Intake Boot>INSTALLATION.](#)
4. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

2. LH SIDE

1. Install the knock sensor and connect the connector.

Note:

- Knock sensor must be positioned so that the connector center comes within the range shown in the figure.
- Make sure that the knock sensor and its connector do not touch the adjacent parts.



(a) Front of engine

Tightening torque:

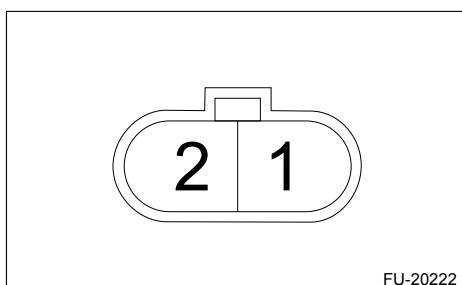
24 N·m (2.4 kgf-m, 17.7 ft-lb)

2. Install the fuel pipe insulator No. 1 and fuel pipe insulator No. 2. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Insulator>INSTALLATION.](#)
3. Install the air intake boot. [Ref. to INTAKE \(INDUCTION\)\(H4DO\)>Air Intake Boot>INSTALLATION.](#)
4. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Knock Sensor

INSPECTION

1. Check that the knock sensor has no deformation, cracks or other damages.
2. Measure the resistance between knock sensor terminals.



Terminal No.	Standard
1 — 2	532 — 588 kΩ

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Throttle Position Sensor

SPECIFICATION

The throttle body cannot be disassembled.

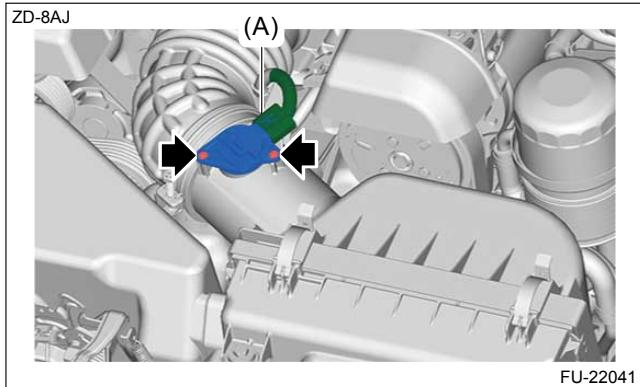
Refer to "Throttle Body" for removal and installation procedure.

-  [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Throttle Body>REMOVAL.](#)
-  [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Throttle Body>INSTALLATION.](#)

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Mass Air Flow and Intake Air Temperature Sensor

REMOVAL

1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Disconnect the connector (A) and remove the mass air flow and intake air temperature sensor.



FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Mass Air Flow and Intake Air Temperature Sensor

INSTALLATION

1. Install the mass air flow and intake air temperature sensor, and connect the connector.

Tightening torque:

1 N·m (0.1 kgf-m, 0.7 ft-lb)

2. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Mass Air Flow and Intake Air Temperature Sensor

INSPECTION

1. CHECK THE MASS AIR FLOW SENSOR UNIT

1. Remove the mass air flow and intake air temperature sensor. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Mass Air Flow and Intake Air Temperature Sensor>REMOVAL.](#)

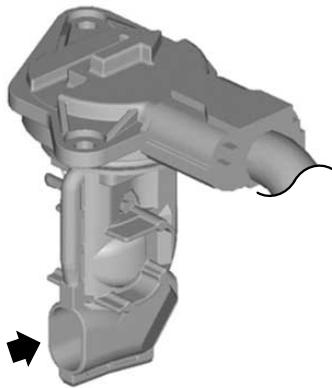
Note:

Do not disconnect the connector.

2. Turn the ignition switch to ON. (Engine OFF)
3. Using the Subaru Select Monitor, read the intake air amount. [Ref. to ENGINE \(DIAGNOSTICS\)\(H4DO\)>Data Monitor.](#)
4. Check that the intake air amount changes when air is blown to the mass air flow sensor unit in the arrow direction.

Caution:

Be careful that no dust enter inside the unit when air is blown.

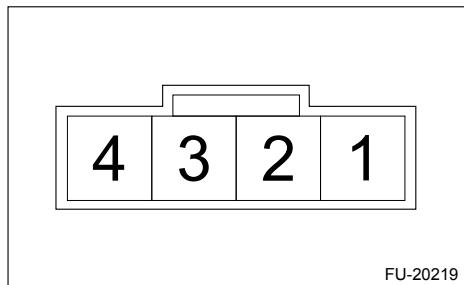


FU-21352

5. After inspection, install the related parts in the reverse order of removal.

2. CHECK THE INTAKE AIR TEMPERATURE SENSOR UNIT

Measure the resistance between intake air temperature sensor terminals.



FU-20219

Temperature	Terminal No.	Standard
-20°C (-4°F)	2 — 4	13.6 — 18.4 kΩ
20°C (68°F)	2 — 4	2.21 — 2.69 kΩ
60°C (140°F)	2 — 4	0.493 — 0.667 kΩ

3. OTHER INSPECTIONS

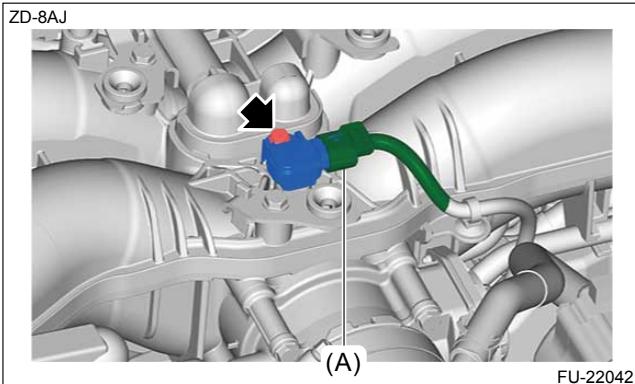
1. Check that the mass air flow and intake air temperature sensor has no deformation, cracks or other damages.
2. Check that the mass air flow and intake air temperature sensor has no dirt.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Manifold Absolute Pressure Sensor

REMOVAL



1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Remove the collector cover. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Collector Cover>REMOVAL.](#)
3. Disconnect the connector (A) and remove the manifold absolute pressure sensor.



FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Manifold Absolute Pressure Sensor

INSTALLATION

1. Using a new O-ring, install the manifold absolute pressure sensor.

Tightening torque:

3.4 N·m (0.3 kgf-m, 2.5 ft-lb)

2. Connect the connector.
3. Install the collector cover. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Collector Cover>INSTALLATION.](#)
4. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

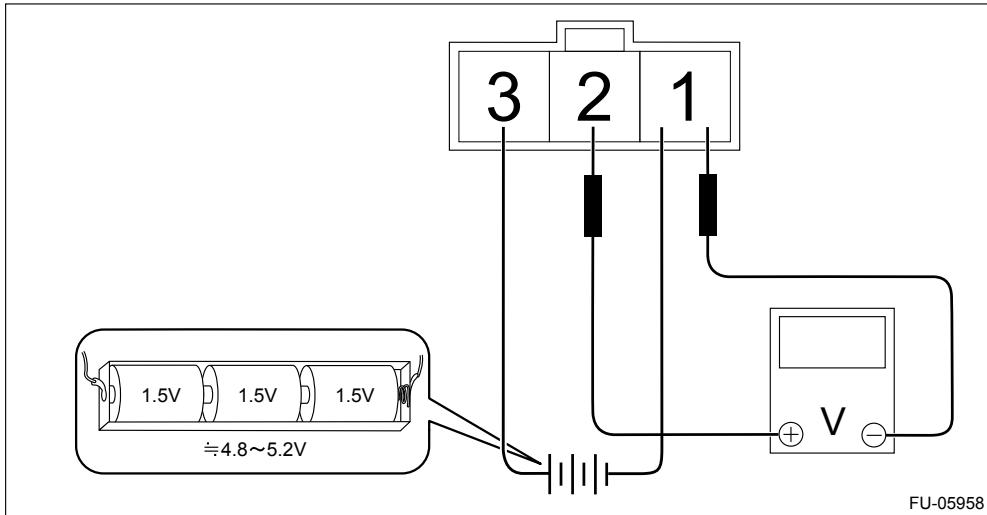
FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Manifold Absolute Pressure Sensor

INSPECTION

1. Check that the manifold absolute pressure sensor has no deformation, cracks or other damages.
2. Using new dry cell batteries, connect the battery positive terminal to terminal No. 3 and the battery negative terminal to terminal No. 1, and connect the circuit tester positive terminal to terminal No. 2 and the circuit tester negative terminal to terminal No. 1.

Note:

- Using a circuit tester, check that the initial voltage of each dry-cell battery is 1.6 V or more. And also check that the voltage of three batteries in series is between 4.8–5.2 V.
- For power supply, 5 V DC constant voltage power source can also be used.



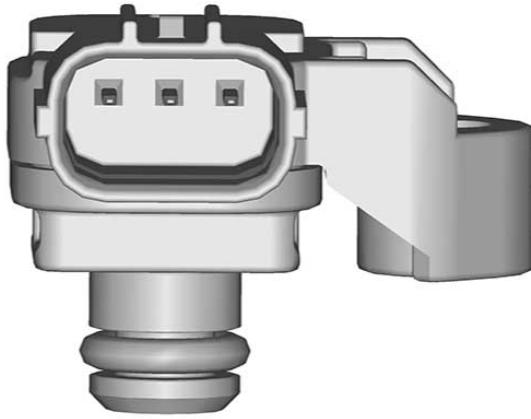
3. Check the voltage at a normal atmospheric pressure.

Note:

The atmospheric pressure at higher altitude is lower than normal. Therefore, the voltage is lower than the standard value.

Terminal No.	Standard
2 (+) – 1 (-)	Approx. 3.6 V (when 25°C (77°F))

4. Connect the Mighty Vac to the pressure port (A) of manifold absolute pressure sensor.



FU-20718

5. Check the voltage when generating vacuum using Mighty Vac.

Caution:

Do not reduce the pressure that exceeds -105 kPa (-1.07 kg/cm^2 , -15.2 psi). Doing so may damage the manifold absolute pressure sensor.

Note:

When vacuum occurs at the pressure port of manifold absolute pressure sensor, the voltage will drop from the value as in step 3.

Pressure	Terminal No.	Standard
-35 kPa (-0.36 kg/cm^2 , -5.1 psi)	2 (+) – 1 (-)	Approx. 2.6 V (when 25°C (77°F))

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Front Oxygen (A/F) Sensor

REMOVAL



Caution:

Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.

1. Disconnect the ground terminal from battery sensor. Ref. to REPAIR CONTENTS>NOTE > BATTERY.
2. Lift up the vehicle.
3. Remove the under cover front. Ref. to EXTERIOR/INTERIOR TRIM>Front Under Cover>REMOVAL.
4. Apply spray-type lubricant to the threaded portion of front oxygen (A/F) sensor, and leave it for one minute or more.

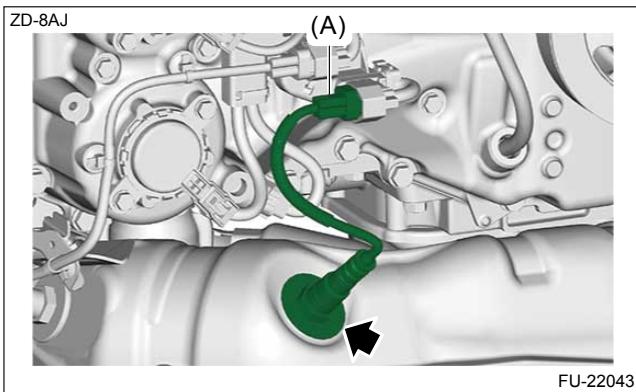
Preparation items:

Spray type lubricant: CRC5-56 (part No. 004301003) or equivalent

5. Disconnect the connector (A) and remove the front oxygen (A/F) sensor.

Caution:

When removing the front oxygen (A/F) sensor, wait until exhaust pipe cools, otherwise it will damage the exhaust pipe.



FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Front Oxygen (A/F) Sensor

INSTALLATION

Caution:

If lubricant is spilt over the exhaust pipe, wipe it off with cloth to avoid emission of smoke or causing a fire.

1. Before installing front oxygen (A/F) sensor, apply anti-seize compound only to the threaded portion of front oxygen (A/F) sensor to make the next removal easier.

Caution:

Never apply anti-seize compound to the protector of front oxygen (A/F) sensor.

Preparation items:

Anti-seize compound: NEVER-SEEZ NSN, JET LUBE SS-30 or equivalent

2. Install the front oxygen (A/F) sensor and connect the connector.

Tightening torque:

21 N·m (2.1 kgf-m, 15.5 ft-lb)

3. Install the under cover front. Ref. to EXTERIOR/INTERIOR TRIM>Front Under Cover>INSTALLATION.

4. Lower the vehicle.

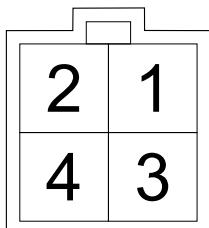
5. Connect the ground terminal to battery sensor. Ref. to REPAIR CONTENTS>NOTE > BATTERY.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Front Oxygen (A/F) Sensor

INSPECTION

1. Check that the front oxygen (A/F) sensor has no deformation, cracks or other damages.

- 2.** Measure the resistance between front oxygen (A/F) sensor terminals.



FU-20223

Terminal No.	Standard
1 — 2	1.8 — 2.2 Ω (at 20°C (68°F))

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Rear Oxygen Sensor

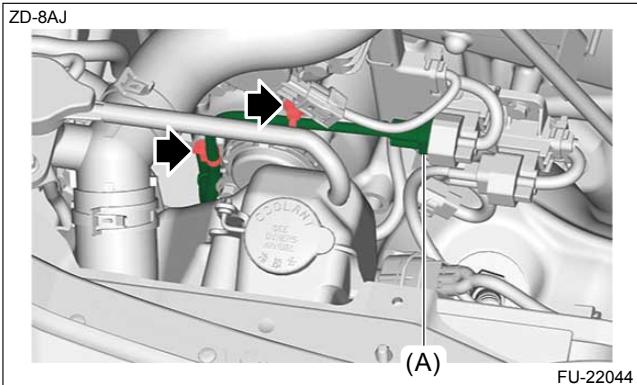
REMOVAL



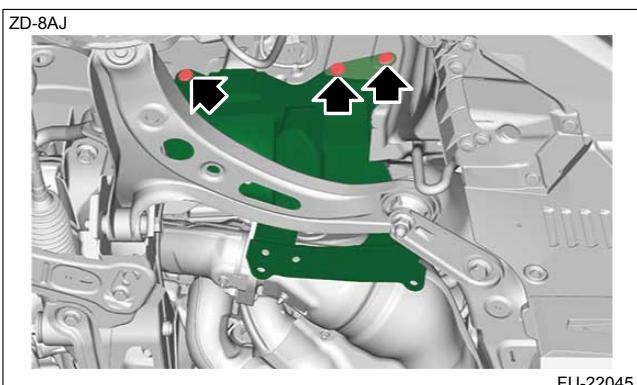
Caution:

Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.

1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Disconnect the connector (A) and remove the clips.



3. Lift up the vehicle.
4. Remove the under cover front. [Ref. to EXTERIOR/INTERIOR TRIM>Front Under Cover>REMOVAL.](#)
5. Remove the under cover front side RH.



6. Apply spray-type lubricant to the threaded portion of rear oxygen sensor, and leave it for one minute or more.

Preparation items:

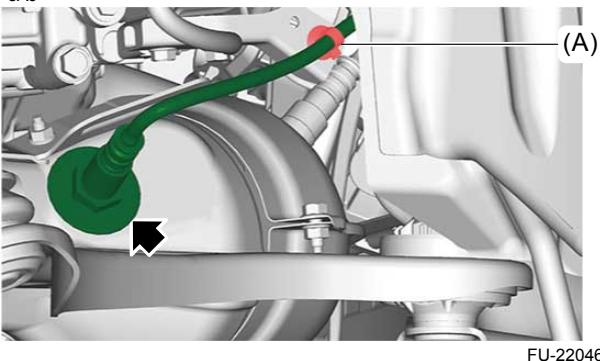
Spray type lubricant: CRC5-56 (part No. 004301003) or equivalent

7. Remove the clip (A) and remove the rear oxygen sensor.

Caution:

When removing the rear oxygen sensor, wait until exhaust pipe cools, otherwise it will damage the exhaust pipe.

ZD-8AJ

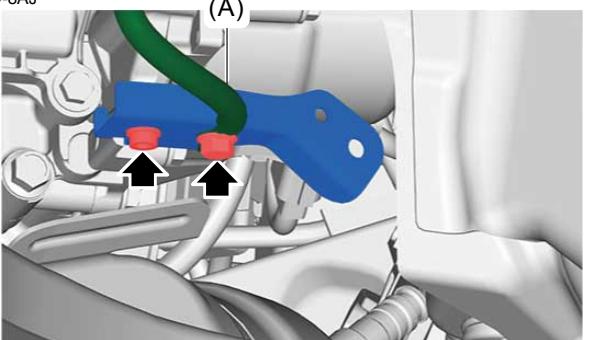


FU-22046

- Remove the rear oxygen sensor bracket together with the ground cord (A).

Note:**Perform this procedure only when required.**

ZD-8AJ



FU-22248

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Rear Oxygen Sensor

INSTALLATION

Caution:**If lubricant is spilt over the exhaust pipe, wipe it off with cloth to avoid emission of smoke or causing a fire.**

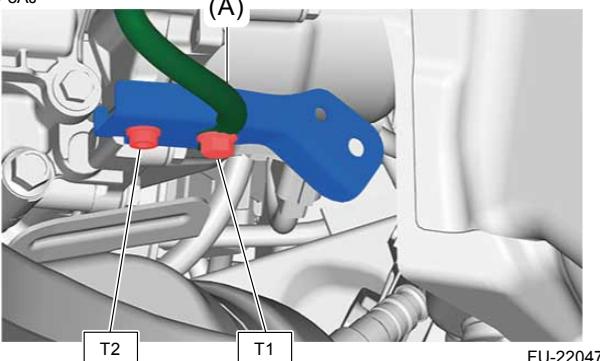
- Install the rear oxygen sensor bracket together with the ground cord (A).

Tightening torque:

T1: 7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

T2: 9.5 N·m (1.0 kgf-m, 7.0 ft-lb)

ZD-8AJ



FU-22047

- Before installing rear oxygen sensor, apply the anti-seize compound only to the threaded portion of rear oxygen sensor to make the next removal easier.

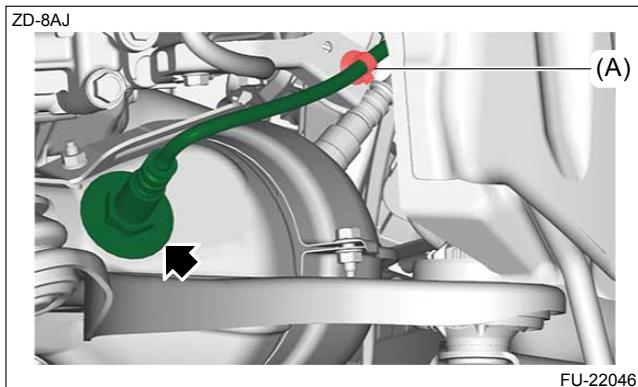
Caution:**Never apply anti-seize compound to the protector of rear oxygen sensor.****Preparation items:**

Anti-seize compound: NEVER-SEEZ NSN, JET LUBE SS-30 or equivalent

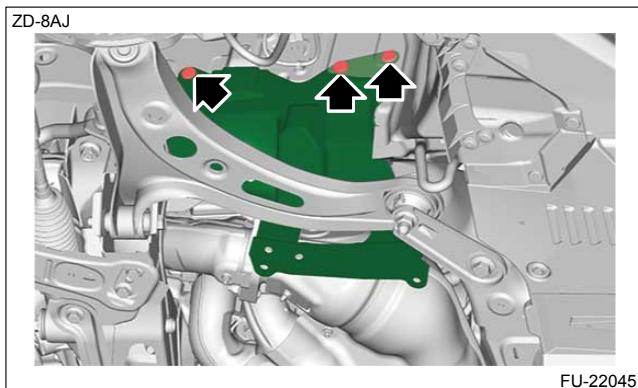
3. Install the rear oxygen sensor and install the clip (A).

Tightening torque:

21 N·m (2.1 kgf·m, 15.5 ft-lb)



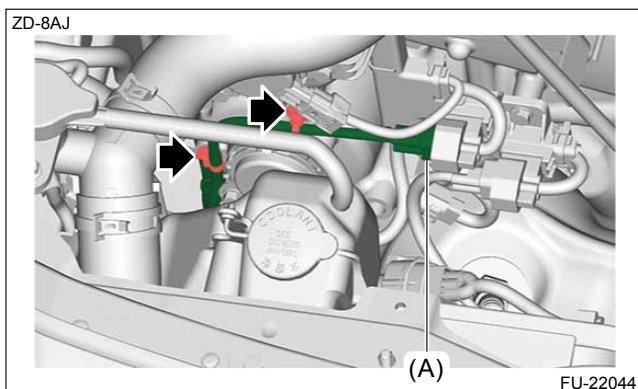
4. Install the under cover front side RH.



5. Install the under cover front. Ref. to EXTERIOR/INTERIOR TRIM>Front Under Cover>INSTALLATION.

6. Lower the vehicle.

7. Install the clip, and connect the connector (A).

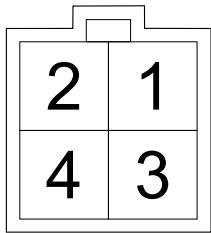


8. Connect the ground terminal to battery sensor. Ref. to REPAIR CONTENTS>NOTE > BATTERY.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Rear Oxygen Sensor

INSPECTION

1. Check that the rear oxygen sensor has no deformation, cracks or other damages.
2. Measure the resistance between rear oxygen sensor terminals.



FU-20223

Terminal No.	Standard
1 — 2	6.4 — 5.0 Ω (at 20°C (68°F))

REMOVAL

SSM4

1. Disconnect the ground terminal from battery sensor.  Ref. to REPAIR CONTENTS>NOTE > BATTERY.
2. Disconnect the connector in numerical order as shown in the figure.

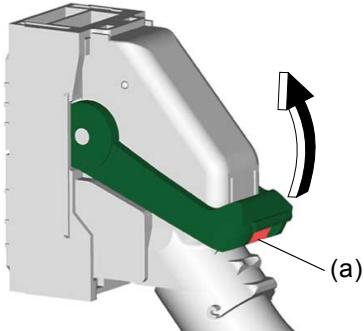
Caution:

Make sure that the lock is released before moving the lever in order to avoid damaging the connector.

Note:

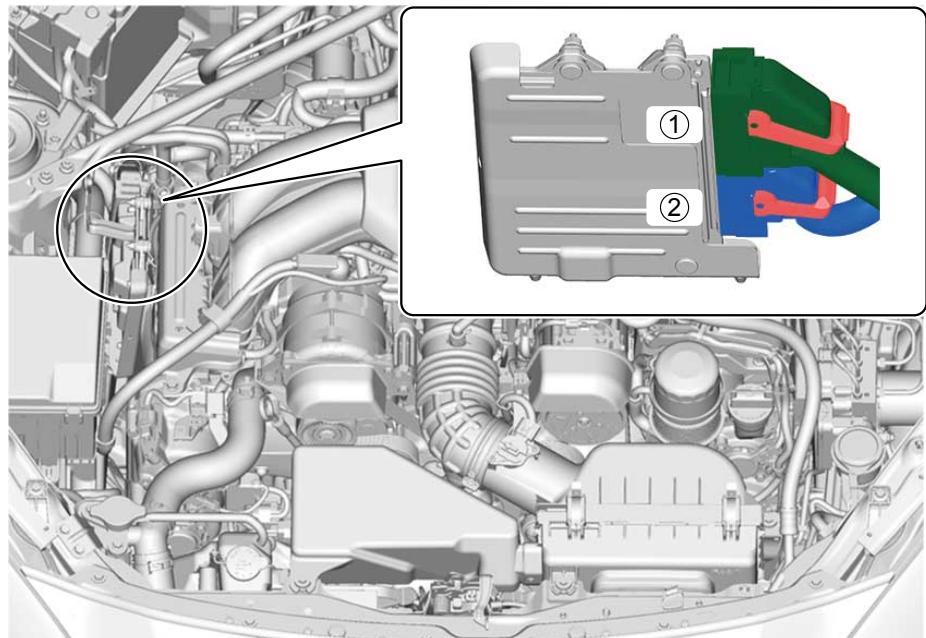
To disconnect the connector, press the portion (a) shown in the figure to release the lock and move the lever in the direction of arrow.

SK-5CJ



ME-22826

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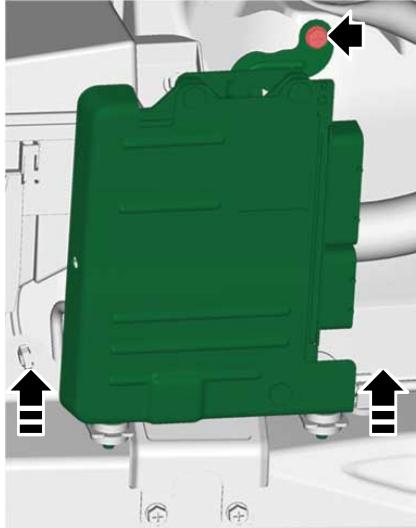
FU-22189

3. Remove the ECM.

Note:

Check the grommet for peel-off or disengagement.

ZD-8AJ



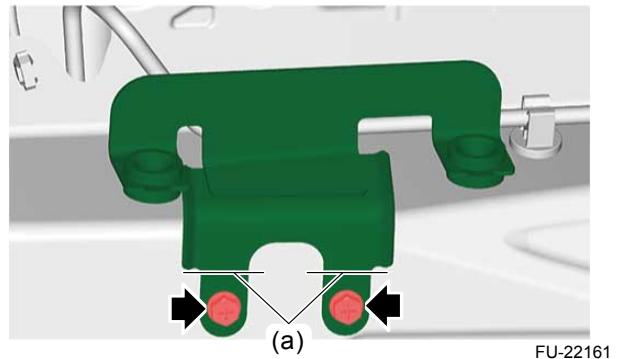
FU-22160

4. Remove the ECM bracket No. 1.

Note:

- Perform this procedure only when required.
- Using a marker pen, make alignment marks (a) to use for positioning brackets during installation.

ZD-8AJ



FU-22161

5. Remove the ECM bracket No. 2 and No. 3.

Note:

- Perform this procedure only when required.

ZD-8AJ



FU-22166

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Engine Control Module (ECM)

INSTALLATION

Caution:

When replacing the ECM, be sure to perform VIN registration, module registration and immobilizer registration after the service.

Note:

When replacing the ECM, be careful not to use the ECM of wrong specification to avoid any damage on the fuel injection system.

1. Install the ECM bracket No. 2 and No. 3.

Tightening torque:

7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

ZD-8AJ



FU-22166

2. Install the ECM bracket No. 1.

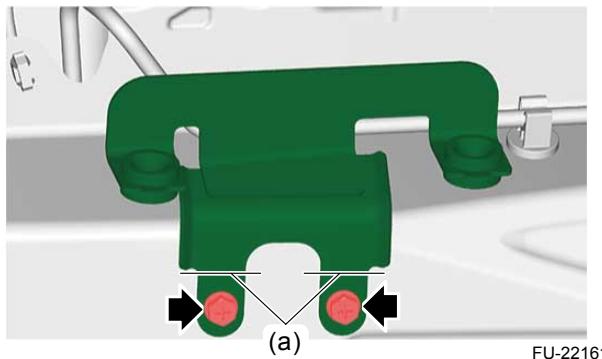
Tightening torque:

7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

Note:

Install the bracket by aligning it with the alignment mark (a).

ZD-8AJ

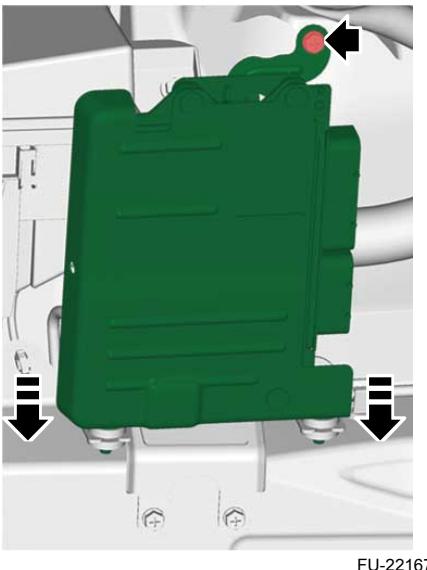


3. Install the ECM.

Note:

Check the grommet for peel-off or disengagement.

ZD-8AJ



4. Connect the connector in numerical order as shown in the figure.

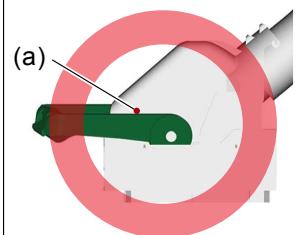
Caution:

To prevent damage to the connector, when connecting the connector, insert the connector straight in until it stops, and while maintaining the position, lock the lever.

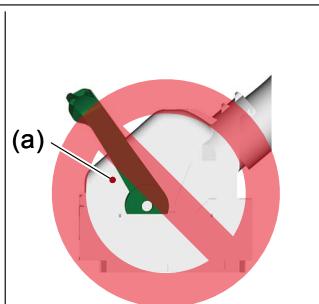
Note:

Check that the lever is located at the position shown in the figure (position beyond the lock portion (a)).

SK-5CJ



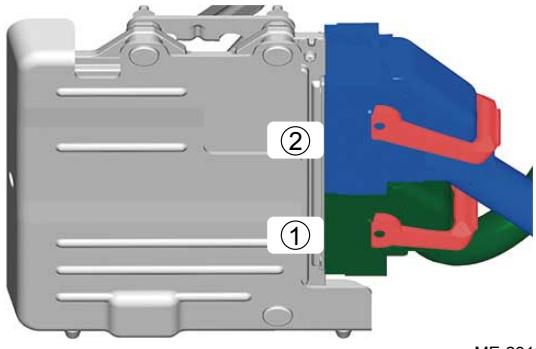
OK



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ME-22837

ZD-8A*



ME-23191

5. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
6. When the ECM is replaced
 - (1) Perform [Entry VIN]. [Ref. to ENGINE \(DIAGNOSTICS\)\(H4DO\)>Work Support.](#)
 - (2) Perform [Module registration]. [Ref. to COMMON \(DIAGNOSTICS\)>Unit Registration>OPERATION.](#)
 - (3) Perform the registration of immobilizer. Refer to "Type H" described in "REGISTRATION MANUAL FOR IMMOBILIZER".

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Engine Control Module (ECM)

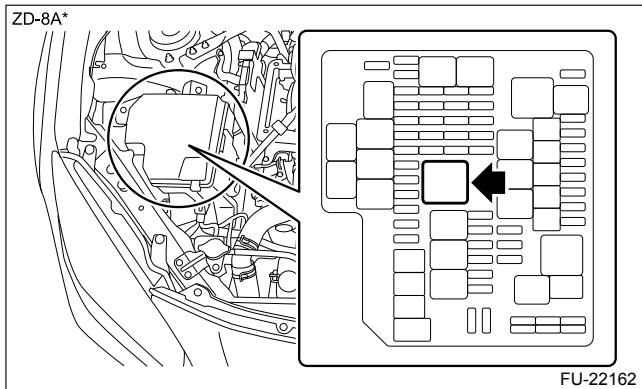
INSPECTION

Check that the ECM has no deformation, cracks or other damages.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Main Relay

REMOVAL

1. Disconnect the ground terminal from battery sensor.  Ref. to REPAIR CONTENTS>NOTE > BATTERY.
2. Remove the main relay from main fuse box.



FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Main Relay

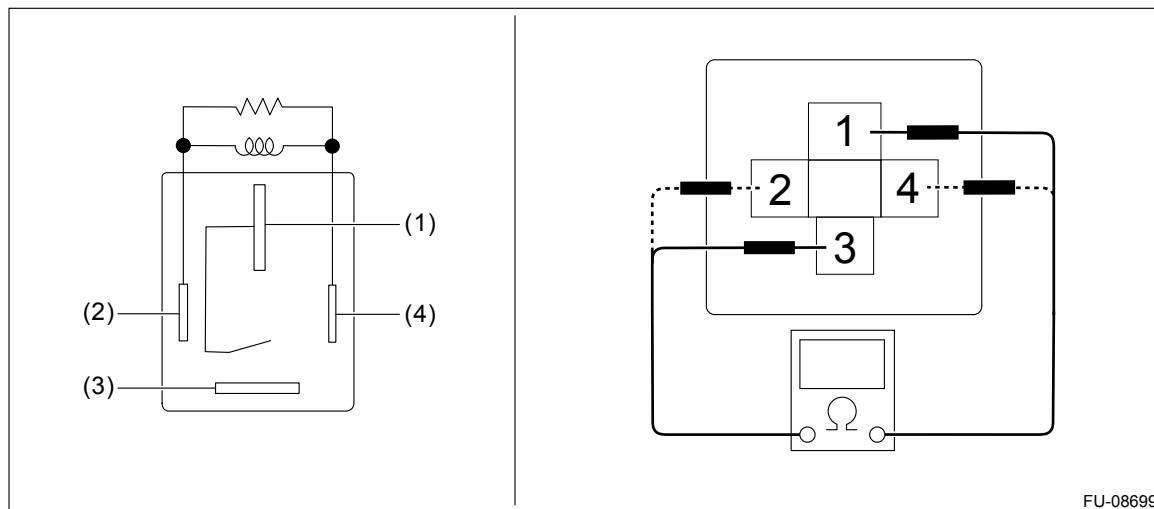
INSTALLATION

1. Install the main relay to the main fuse box.
2. Connect the ground terminal to battery sensor.  Ref. to REPAIR CONTENTS>NOTE > BATTERY.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Main Relay

INSPECTION

1. Check that the main relay has no deformation, cracks or other damages.
2. Measure the resistance between main relay terminals.

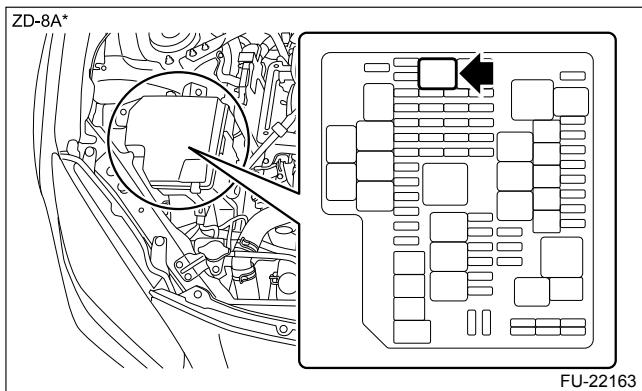


Terminal No.	Inspection conditions	Standard
1 – 3	Always	1 MΩ or more
1 – 3	Apply battery voltage between terminals 2 and 4.	Less than 1 Ω

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Pump Relay

REMOVAL

1. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
2. Remove the fuel pump relay from the main fuse box.



FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Pump Relay

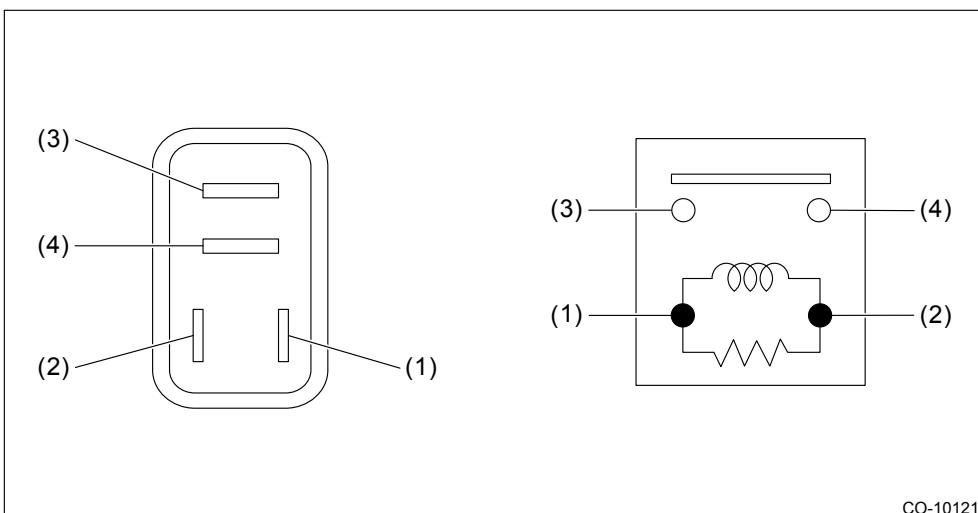
INSTALLATION

1. Install the fuel pump relay to the main fuse box.
2. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Pump Relay

INSPECTION

1. Check that the fuel pump relay has no deformation, cracks or other damages.
2. Measure the resistance between fuel pump relay terminals.



CO-10121

Terminal No.	Inspection conditions	Standard
3 – 4	Always	1 MΩ or more
3 – 4	Apply battery voltage between terminals 1 and 2.	Less than 1 Ω

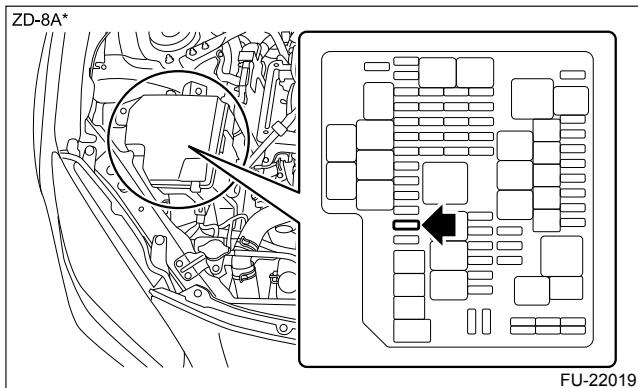
PROCEDURE**1. RELEASING OF FUEL PRESSURE****Warning:**

Place "NO OPEN FLAMES" signs near the working area.

Caution:

Be careful not to spill fuel.

1. Remove the fuse of fuel pump from main fuse box.



2. Start the engine and run it until it stalls.
3. After the engine stalls, crank it for five more seconds.
4. Turn the ignition switch to OFF.
5. Install the fuse of fuel pump to the main fuse box.

2. DRAINING FUEL (WITH SUBARU SELECT MONITOR)**Warning:**

Place "NO OPEN FLAMES" signs near the working area.

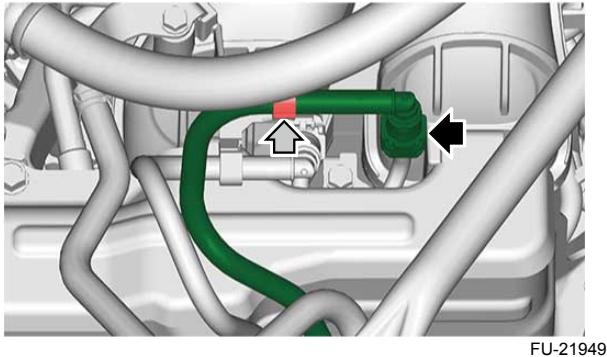
Caution:

Be careful not to spill fuel.

Note:

- If the fuel pump cannot be driven, refer to "DRAINING FUEL (WITH OTHER THAN SUBARU SELECT MONITOR)". [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel>PROCEDURE > DRAINING FUEL \(WITH OTHER THAN SUBARU SELECT MONITOR\).](#)
- Be careful not to let the battery run-out.
- Be aware that the fuel may remain in the fuel tank after draining the fuel.

1. Release the fuel pressure. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel>PROCEDURE > RELEASING OF FUEL PRESSURE.](#)
2. Disconnect the fuel delivery tube (cylinder direct injection side) and remove it from the fuel delivery tube clamp. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>REMOVAL > QUICK CONNECTOR DISCONNECTION \(TYPE A\).](#)



FU-21949

3. Connect the ST to the fuel delivery tube (cylinder direct injection side).

Special tool:

FUEL PIPE ADAPTER (18471AA000)

4. Connect the gasoline proof hose to ST and put the end of the hose in the container.
5. Drive the fuel pump and drain the fuel using Subaru Select Monitor. Ref. to ENGINE (DIAGNOSTICS)(H4DO)>Active Test.

Caution:

- Be careful not to spill fuel.
- Always collect fuel using a dedicated fuel container.

6. Install the related parts in the reverse order after draining the fuel.

Caution:

- Be careful not to spill fuel.
- Catch the fuel from the tubes using a container or cloth.
- Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.
- When connecting the quick connector, make sure to insert it all the way in before locking the slider.
- When it is difficult to lock the slider, check that the connector is fully inserted.
- After locking the slider, pull the quick connector itself to the disconnecting direction, and then push to the connecting direction in order to confirm secure connection. Always make sure to perform this confirmation ending up with a pushing in.

Note:

For information about connecting the quick connector on the fuel delivery tube, refer to "Fuel Delivery and Evaporation Lines". Ref. to FUEL INJECTION (FUEL SYSTEMS)(H4DO)>Fuel Delivery and Evaporation Lines>INSTALLATION > QUICK CONNECTOR CONNECTION (TYPE A).

3. DRAINING FUEL (WITH OTHER THAN SUBARU SELECT MONITOR)

Warning:

Place "NO OPEN FLAMES" signs near the working area.

Caution:

- Be careful not to spill fuel.
- Fuel may remain in the fuel filler pipe. Drain the fuel from the fuel filler pipe through the fill opening using the gasoline proof pump and the gasoline proof hose ($\varnothing 10$ or less) before the operation.

Note:

Be aware that the fuel may remain in the fuel tank after draining the fuel.

1. Set the vehicle on a lift.
2. Open the fuel filler lid and remove the fuel filler cap.
3. Drain the fuel from the fuel filler pipe through the fill opening using the gasoline proof pump and the gasoline proof hose ($\varnothing 10$ or less).
4. Lift up the vehicle.
5. Disconnect the fuel filler hose from the fuel filler pipe.

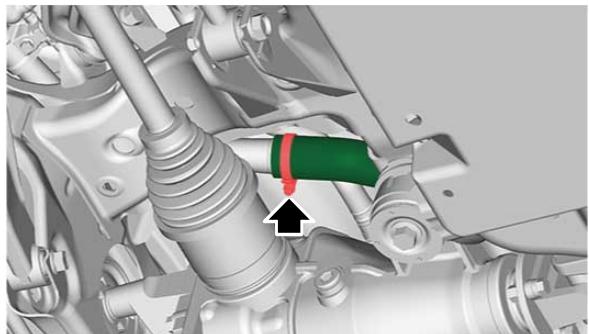
Caution:

- Be careful not to spill fuel.
- Always collect fuel using a dedicated fuel container.

Caution:

- Be careful not to spill fuel.
- Catch the fuel from hoses using a container or cloth.

ZD-8AU



6. Set the container under the vehicle and insert the gasoline proof hose ($\varnothing 10$ or less) into the fuel filler hose to drain the fuel.

Caution:

- Be careful not to spill fuel.
- Always collect fuel using a dedicated fuel container.

7. Install the related parts in the reverse order after draining the fuel.

Note:

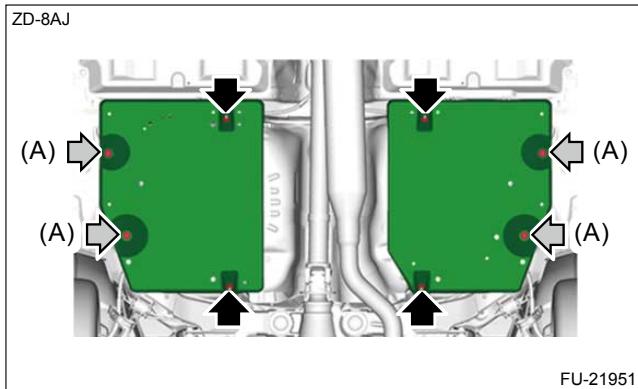
For information about connecting fuel filler hose, refer to "Fuel Delivery and Evaporation Lines".  [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>INSTALLATION > FUEL FILLER HOSE CONNECTION.](#)

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Tank Protector

REMOVAL



1. Lift up the vehicle.
2. Remove the nut and clip (A) and remove the fuel tank protector.



FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Tank Protector

INSTALLATION

1. Install the fuel tank protector.

Caution:

Be sure to use a new self-locking nut.

Tightening torque:

9 N·m (0.9 kgf-m, 6.6 ft-lb)

2. Lower the vehicle.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Tank Protector

INSPECTION

Check that the fuel tank protector has no deformation, cracks or other damages.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Tank

REMOVAL



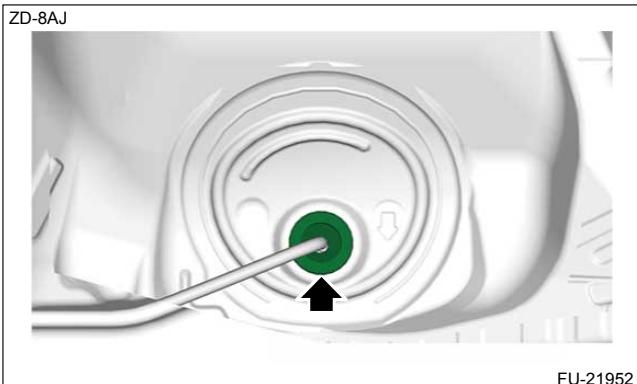
Warning:

Place "NO OPEN FLAMES" signs near the working area.

Caution:

- Be careful not to spill fuel.
- Catch the fuel from the tubes using a container or cloth.

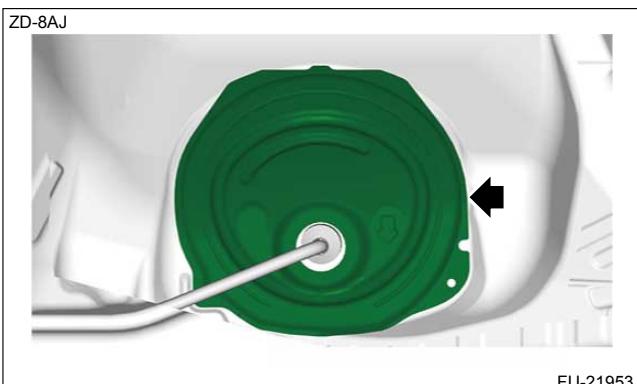
1. Release the fuel pressure. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel>PROCEDURE > RELEASING OF FUEL PRESSURE.](#)
2. Drain fuel. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel>PROCEDURE > DRAINING FUEL \(WITH SUBARU SELECT MONITOR\).](#)
3. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
4. Remove the cushion assembly rear seat LH and the cushion assembly rear seat RH. [Ref. to SEATS>Rear Seat>REMOVAL.](#)
5. Remove the service hole cover LH of fuel pump.
(1) Push in the grommet to remove the grommet from the service hole cover LH.



- (2) Carefully remove the butyl tape and remove the service hole cover LH.

Caution:

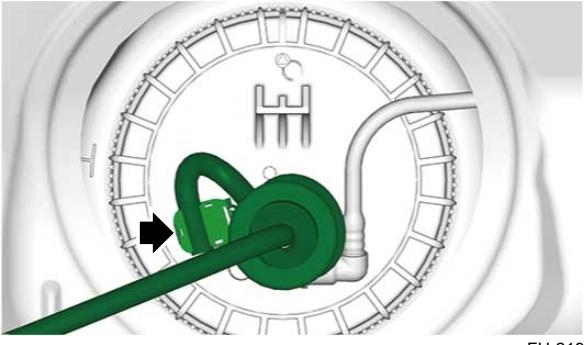
To prevent deformation of the service hole cover, use special care not to apply excessive force to the service hole cover during the work.



- (3) Remove the butyl tape from the floor and the service hole cover LH.

6. Disconnect the connector from fuel pump.

ZD-8AJ



FU-21954

7. Remove the service hole cover RH of fuel sub level sensor.

- (1) Push in the grommet to remove the grommet from the service hole cover RH.

ZD-8AJ



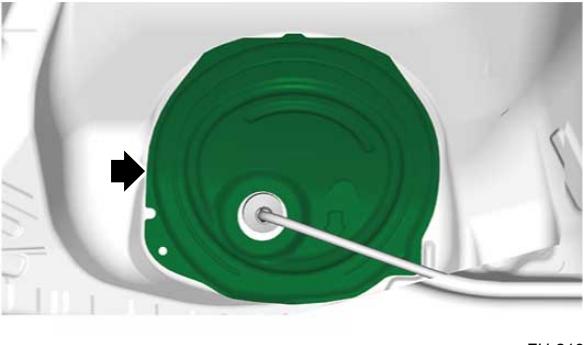
FU-21955

- (2) Carefully remove the butyl tape and remove the service hole cover RH.

Caution:

To prevent deformation of the service hole cover, use special care not to apply excessive force to the service hole cover during the work.

ZD-8AJ

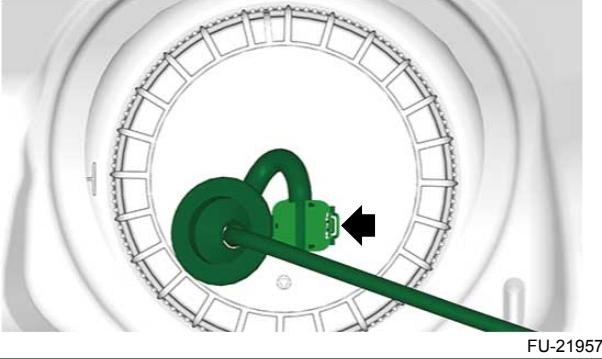


FU-21956

- (3) Remove the butyl tape from the floor and the service hole cover RH.

8. Disconnect the connector from the fuel sub level sensor.

ZD-8AJ



9. Lift up the vehicle.

10. Remove the fuel tank protector. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Tank Protector>REMOVAL.](#)

11. Remove the rear suspension assembly. [Ref. to REAR SUSPENSION>Sub Frame>REMOVAL.](#)

12. Disconnect the fuel filler hose (A), circulate tube (B) and vent tube (C).

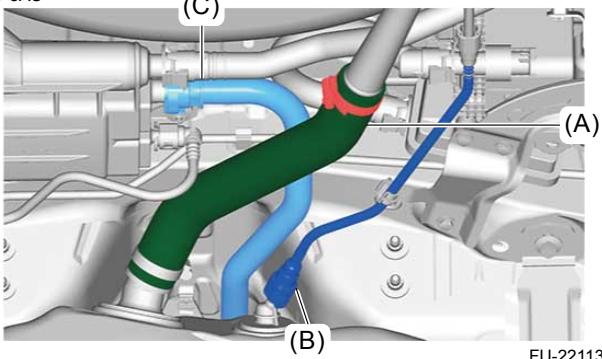
Circulate tube:

[Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>REMOVAL > QUICK CONNECTOR DISCONNECTION \(TYPE D\).](#)

Vent tube:

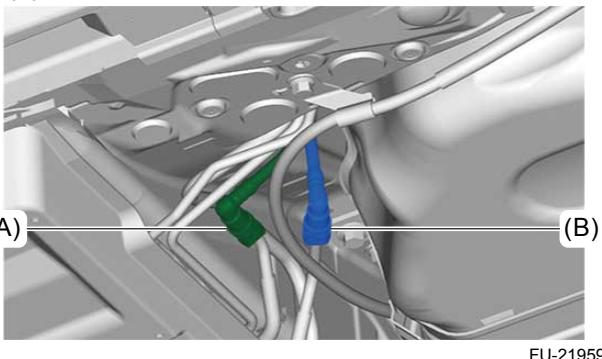
[Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>REMOVAL > QUICK CONNECTOR DISCONNECTION \(TYPE H\).](#)

ZD-8AU



13. Disconnect the fuel delivery tube (A) and fuel delivery tube (B) from the fuel pipe assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>REMOVAL > QUICK CONNECTOR DISCONNECTION \(TYPE E\).](#)

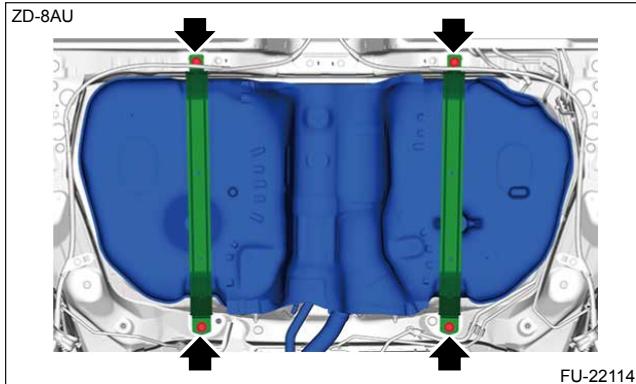
ZD-8AJ



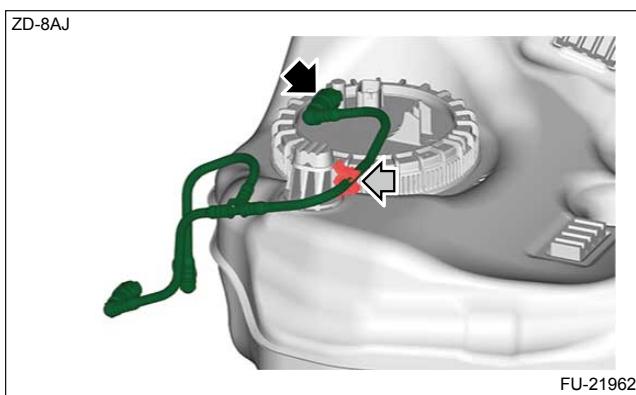
14. Support the fuel tank with a transmission jack, remove the bolts from the fuel tank band, and remove the fuel tank from the vehicle.

Caution:

- A helper is required to perform this work.
- Fuel may remain in the fuel tank. This will cause the left and right sides to be unbalanced. Be careful not to drop it.



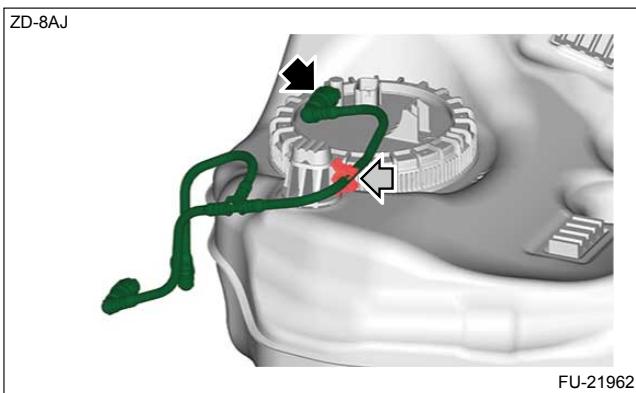
- 15.** Disconnect the fuel delivery tube from the fuel pump and remove it from the clamp. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\) \(H4DO\)>Fuel Delivery and Evaporation Lines>REMOVAL > QUICK CONNECTOR DISCONNECTION \(TYPE D\).](#)



FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Tank

INSTALLATION

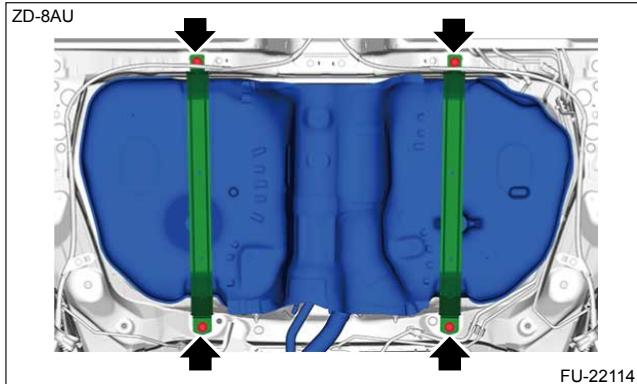
- 1.** Connect the fuel delivery tube to the fuel pump and install it to the clamp. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\) \(H4DO\)>Fuel Delivery and Evaporation Lines>INSTALLATION > QUICK CONNECTOR CONNECTION \(TYPE D\).](#)



- 2.** Support the fuel tank with a transmission jack, set the fuel tank in place, and temporarily tighten the bolts of the fuel tank band.

Caution:

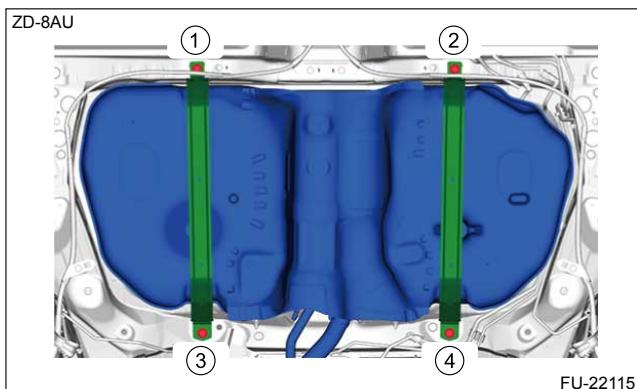
A helper is required to perform this work.



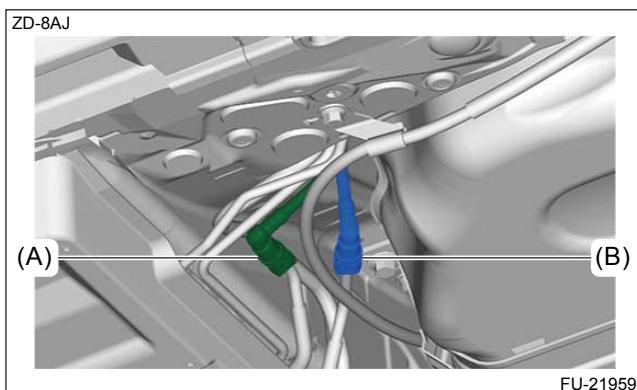
- 3.** Tighten the bolts of the fuel tank band in the numerical order shown in the figure.

Tightening torque:

33 N·m (3.4 kgf-m, 24.3 ft-lb)



- 4.** Connect the fuel delivery tube (B) and fuel delivery tube (A) to the fuel pipe assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>INSTALLATION > QUICK CONNECTOR CONNECTION \(TYPE E\).](#)



- 5.** Connect the vent tube (C), circulate tube (B) and fuel filler hose (A).

Vent tube:

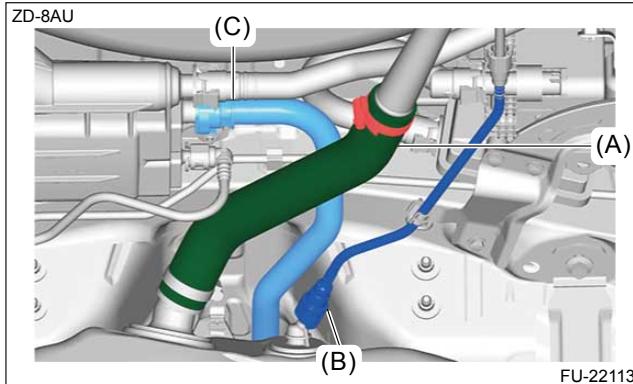
[Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>INSTALLATION > QUICK CONNECTOR CONNECTION \(TYPE H\).](#)

Circulate tube:

[Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>INSTALLATION > QUICK CONNECTOR CONNECTION \(TYPE D\).](#)

Fuel filler hose:

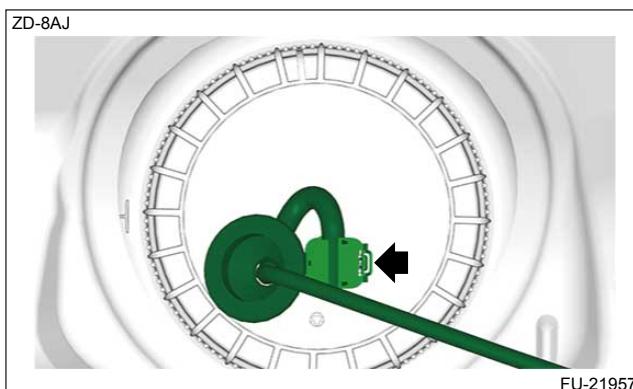
[Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>INSTALLATION > FUEL FILLER HOSE CONNECTION.](#)



6. Install the rear suspension assembly. [Ref. to REAR SUSPENSION>Sub Frame>INSTALLATION.](#)
7. Install the fuel tank protector. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Tank Protector>INSTALLATION.](#)
8. Lower the vehicle.
9. Set the harness on the service hole cover RH and connect the connector to the fuel sub level sensor.

Caution:

Before connecting, make sure that there are no foreign matters, water, etc. inside the connectors of fuel sub level sensor and harness. If any foreign matters, water, etc. are found, remove them with air blow and connect the connector after it has dried completely.



10. Install the service hole cover RH of fuel sub level sensor.

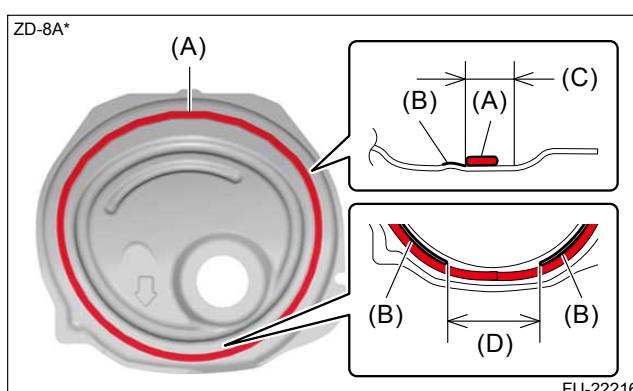
- (1) Apply new butyl tape as shown in the figure.

Note:

- Before applying butyl tape, degrease the attaching surface of the service hole cover.
- Apply butyl tape within the range A.
- Apply butyl tape seamlessly along the attachment guide on the service hole cover.
- Apply butyl tape so that the start and the end of application overlap within the range B shown in the figure.

Preparation items:

Butyl tape: 3M Butyl Tape 8626 or equivalent



(A) Butyl tape

(C) Range A

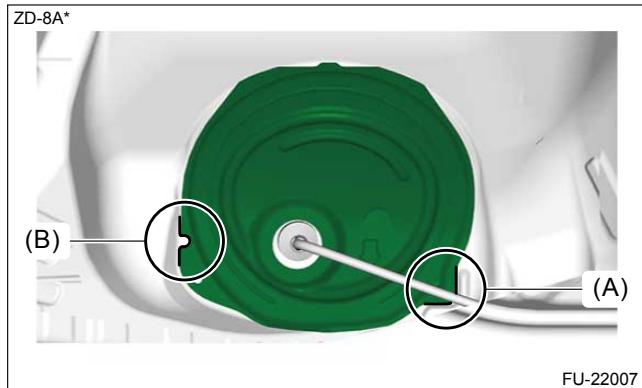
(D) Range B

(B) Application guide

- (2) Set the service hole cover RH to the position shown in the figure.

Note:

Before setting the service hole cover, degrease the attaching surface of the floor.

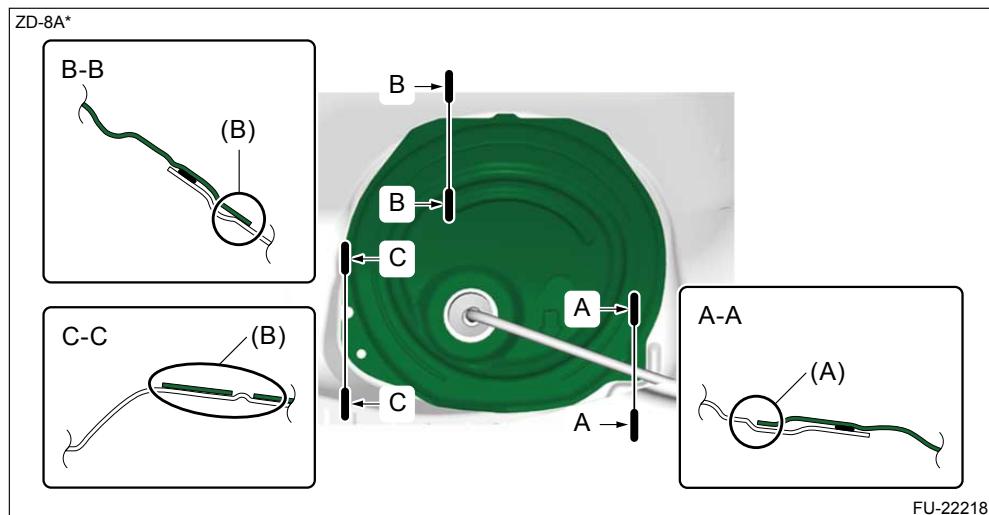


- (A) Corner bead on the floor and flange of the service hole cover
(B) Floor protrusion and cutout on the service hole cover

- (3) Install the service hole cover RH to the floor as shown in the figure.

Note:

Press hard the entire perimeter of the butyl tape attachment area on the service hole cover for secure adhesion.



- (A) Align the height of the flange of the service hole cover with the height of the corner bead on the floor.
(B) Closely attach the flange of the service hole cover to the floor.

- (4) Install the grommet to the service hole cover RH.

ZD-8AJ



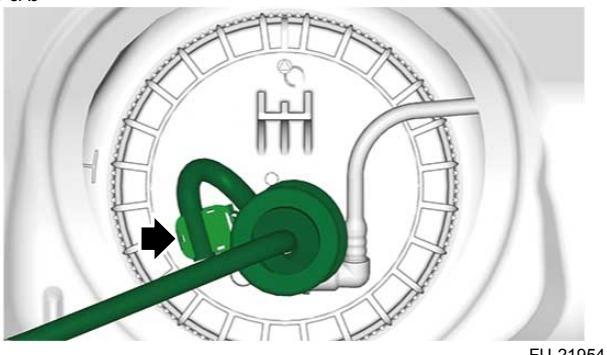
FU-21955

11. Connect the connector to the fuel pump.

Caution:

Before connecting, make sure that there are no foreign matters, water, etc. inside the connectors of fuel pump and harness. If any foreign matters, water, etc. are found, remove them with air blow and connect the connector after it has dried completely.

ZD-8AJ



FU-21954

12. Install the service hole cover LH of fuel pump.

- (1) Apply new butyl tape as shown in the figure.

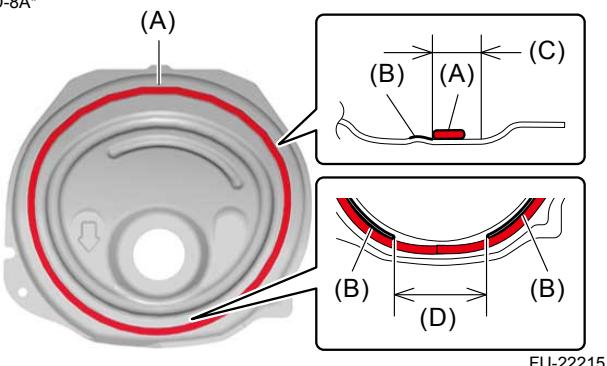
Note:

- Before applying butyl tape, degrease the attaching surface of the service hole cover.
- Apply butyl tape within the range A.
- Apply butyl tape seamlessly along the attachment guide on the service hole cover.
- Apply butyl tape so that the start and the end of application overlap within the range B shown in the figure.

Preparation items:

Butyl tape: 3M Butyl Tape 8626 or equivalent

ZD-8A*



FU-22215

(A) Butyl tape

(C) Range A

(D) Range B

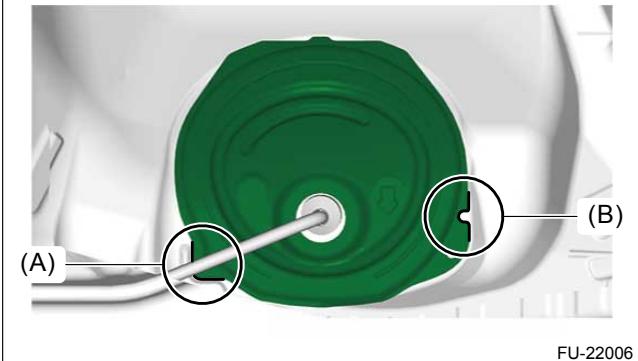
(B) Application guide

- (2) Set the service hole cover LH to the position shown in the figure.

Note:

Before setting the service hole cover, degrease the attaching surface of the floor.

ZD-8A*



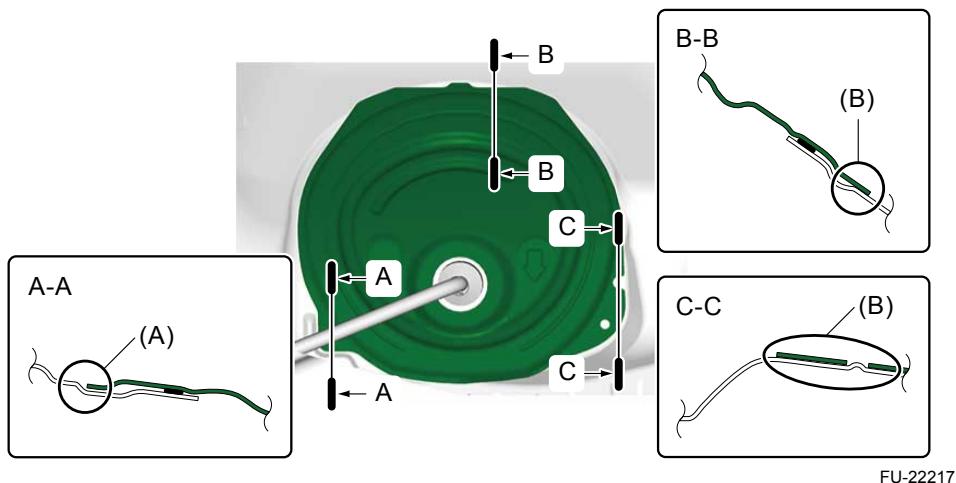
- (A) Corner bead on the floor and flange of the service hole cover
(B) Floor protrusion and cutout on the service hole cover

(3) Install the service hole cover LH to the floor as shown in the figure.

Note:

Press hard the entire perimeter of the butyl tape attachment area on the service hole cover for secure adhesion.

ZD-8A*



- (A) Align the height of the flange of the service hole cover with the height of the corner bead on the floor.
(B) Closely attach the flange of the service hole cover to the floor.

(4) Install the grommet to the service hole cover LH.

ZD-8AJ



FU-21952

13. Install the cushion assembly rear seat RH and the cushion assembly rear seat LH. [Ref. to SEATS>Rear Seat>INSTALLATION.](#)

14. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

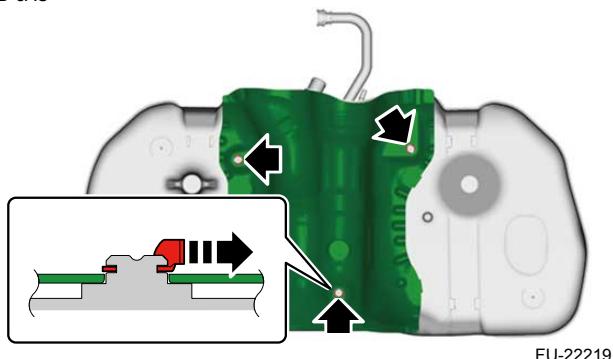
FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Tank

DISASSEMBLY



- 1.** Remove the hoses from the fuel tank. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>General Description>COMPONENT > FUEL TANK 1.](#)
- 2.** Remove the fuel sub delivery tube. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>REMOVAL.](#)
- 3.** Remove the fuel tank cover from the fuel tank.

ZD-8AU



FU-22219

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Tank

ASSEMBLY

- 1.** Install the cushion assembly (A) to the fuel tank. (When replacing with a new part)

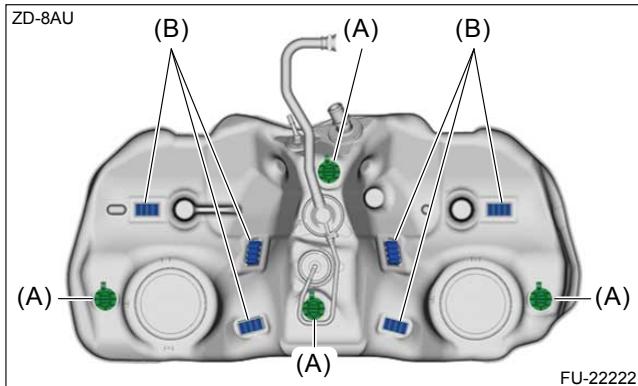
Note:

After installing the cushion assembly, confirm that the claw section on the cushion assembly is securely inserted into the fuel tank.

- 2.** Attach the cushion (B) to the fuel tank. (When replacing with a new part)

Note:

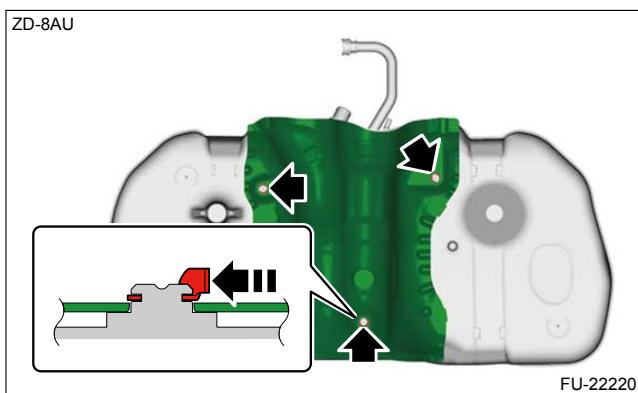
- When replacing the fuel tank with a new one, attach a new cushion before using.
- Before attaching the cushion, degrease the attaching surface of fuel tank.



3. Install the fuel tank cover to the fuel tank.

Caution:

Check that the fuel tank cover has no deformation, cracks or other damages. If the fuel tank cover is defective, replace it with a new fuel tank cover.



4. Install the fuel sub delivery tube. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>INSTALLATION.](#)
5. Connect individual hoses to the fuel tank. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>General Description>COMPONENT > FUEL TANK 1.](#)

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Tank

INSPECTION

1. Check that the fuel tank, fuel tank cover and fuel pipe have no deformation, cracks and other damages.
2. Check that the hose and tube have no cracks, damage or loose part.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Filler Cap

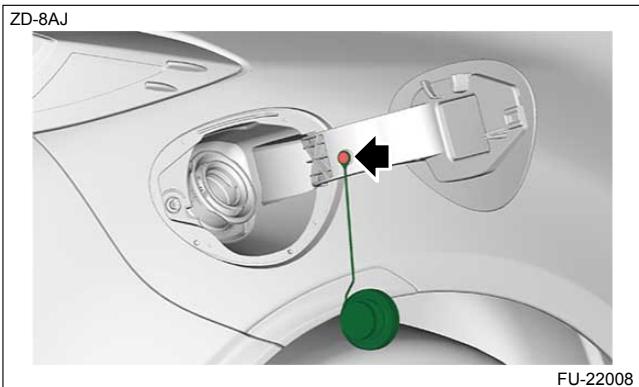
REMOVAL



Warning:

Place "NO OPEN FLAMES" signs near the working area.

1. Open the fuel filler lid and remove the fuel filler cap.
2. Remove the clip and remove the fuel filler cap from the filler lid.



FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Filler Cap

INSTALLATION

1. Using a new clip, install the fuel filler cap to the filler lid.
2. Install the fuel filler cap, and close the fuel filler lid.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Filler Cap

INSPECTION

Check that the fuel filler cap does not have deformation, cracks or other damages.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Filler Pipe

REMOVAL



Warning:

Place "NO OPEN FLAMES" signs near the working area.

Caution:

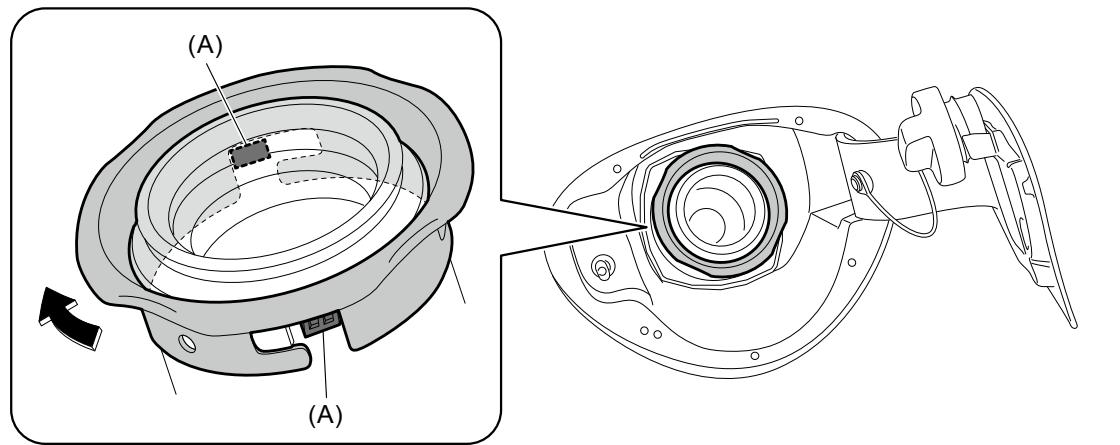
Be careful not to spill fuel.

Note:

For the removal procedure of fuel filler lid, refer to "Fuel Lid". [Ref. to SECURITY AND LOCKS>Fuel Lid>REMOVAL.](#)

1. Release the fuel pressure. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel>PROCEDURE > RELEASING OF FUEL PRESSURE.](#)
2. Drain fuel. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel>PROCEDURE > DRAINING FUEL \(WITH SUBARU SELECT MONITOR\).](#)
3. Open the fuel filler lid and remove the fuel filler cap.
4. Release the lock (A), and turn the fuel filler pipe protector in the direction of the arrow to remove it.

ZD-8A*



FU-21948

5. Lift up the vehicle.
6. Remove the rear suspension assembly. [Ref. to REAR SUSPENSION>Sub Frame>REMOVAL.](#)
7. Remove the mud guard rear RH. [Ref. to EXTERIOR/INTERIOR TRIM>Mud Guard>REMOVAL.](#)
8. Disconnect the fuel filler hose (A), circulate tube (B) and drain tube (C) from the fuel filler pipe.

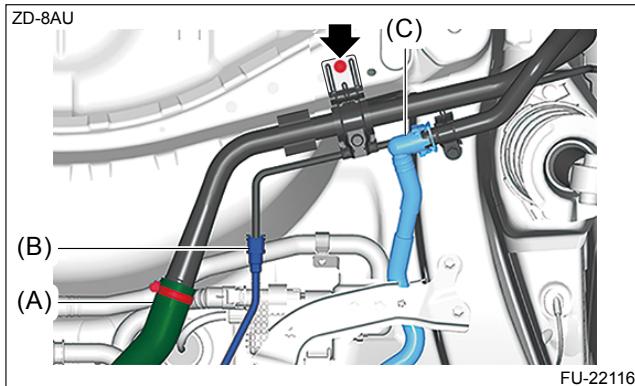
Circulate tube:

[Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>REMOVAL > QUICK CONNECTOR DISCONNECTION \(TYPE D\).](#)

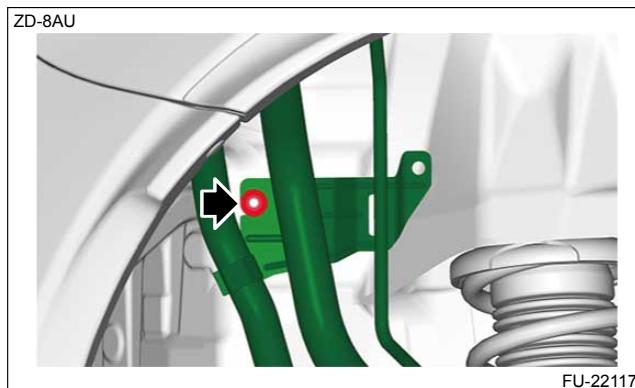
Drain tube:

[Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>REMOVAL > QUICK CONNECTOR DISCONNECTION \(TYPE G\).](#)

9. Remove the bolt securing the fuel filler pipe.



- 10.** Remove the nut securing the fuel filler pipe, and remove the fuel filler pipe from underneath of the vehicle.



FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Filler Pipe

INSTALLATION

Note:
For the installation procedure of fuel filler lid, refer to "Fuel Lid". [Ref. to SECURITY AND LOCKS>Fuel Lid>INSTALLATION.](#)

- 1.** Open the fuel filler lid.
- 2.** Insert the fuel filler pipe into the ring clip from inside of the rear fender.
- 3.** Install the nut securing the fuel filler pipe.

Tightening torque:

7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



- 4.** Install the bolt securing the fuel filler pipe.

Tightening torque:

7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

- 5.** Connect the drain tube (C), circulate tube (B) and fuel filler hose (A).

Drain tube:

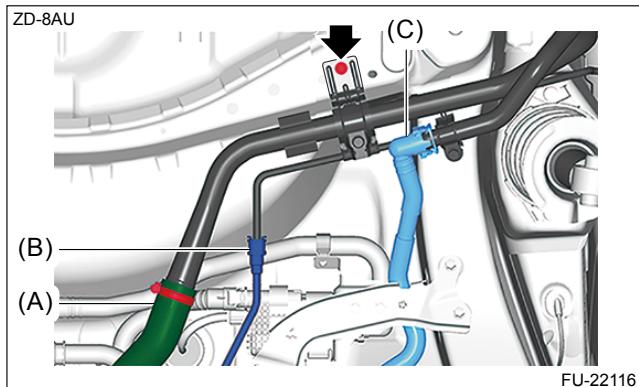
 Ref. to FUEL INJECTION (FUEL SYSTEMS)(H4DO)>Fuel Delivery and Evaporation Lines>INSTALLATION > QUICK CONNECTOR CONNECTION (TYPE G).

Circulate tube:

 Ref. to FUEL INJECTION (FUEL SYSTEMS)(H4DO)>Fuel Delivery and Evaporation Lines>INSTALLATION > QUICK CONNECTOR CONNECTION (TYPE D).

Fuel filler hose:

 Ref. to FUEL INJECTION (FUEL SYSTEMS)(H4DO)>Fuel Delivery and Evaporation Lines>INSTALLATION > FUEL FILLER HOSE CONNECTION.



6. Install the mud guard rear RH.  Ref. to EXTERIOR/INTERIOR TRIM>Mud Guard>INSTALLATION.
7. Install the rear suspension assembly.  Ref. to REAR SUSPENSION>Sub Frame>INSTALLATION.
8. Install the fuel filler pipe protector.
9. Install the fuel filler cap, and close the fuel filler lid.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Filler Pipe

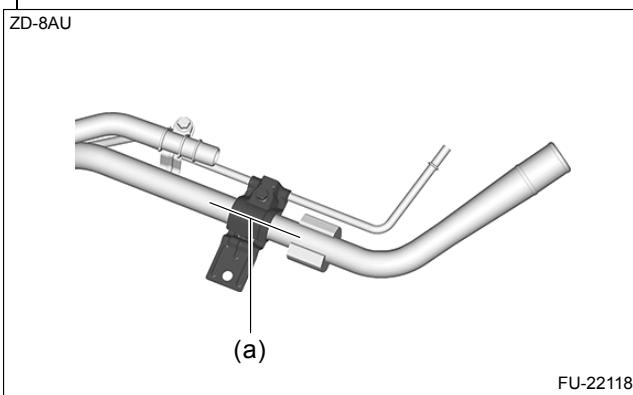
DISASSEMBLY



1. Disassemble the fuel filler pipe.  Ref. to FUEL INJECTION (FUEL SYSTEMS)(H4DO)>General Description>COMPONENT > FUEL FILLER CAP AND FUEL FILLER PIPE.

Note:

Using a marker pen, make alignment marks (a) to use for positioning brackets during assembly.



FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Filler Pipe

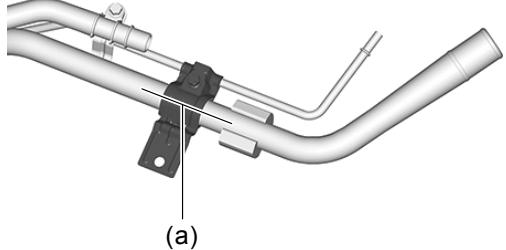
ASSEMBLY

1. Using a new neck holder, assemble the fuel filler pipe.  Ref. to FUEL INJECTION (FUEL SYSTEMS)(H4DO)>General Description>COMPONENT > FUEL FILLER CAP AND FUEL FILLER PIPE.

Note:

Install the bracket to the fuel filler pipe by aligning it with the alignment mark (a).

ZD-8AU



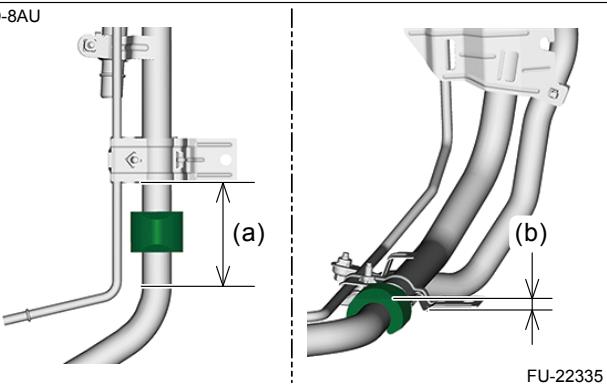
FU-22118

2. Attach cushion to the fuel filler pipe. (When replacing with a new part)

Note:

- Before attaching the cushion, degrease the attachment area of fuel filler pipe.
- Attach the cushion to the range (a) as shown in the figure.
- Attach the cushion so that it is parallel to the bracket (b).

ZD-8AU



FU-22335

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Filler Pipe

INSPECTION

1. Check that the fuel filler pipe has no deformation, cracks or other damages.
2. Check that the hose and tube have no cracks, damage or loose part.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Pump Assembly

REMOVAL



Warning:

Place "NO OPEN FLAMES" signs near the working area.

Caution:

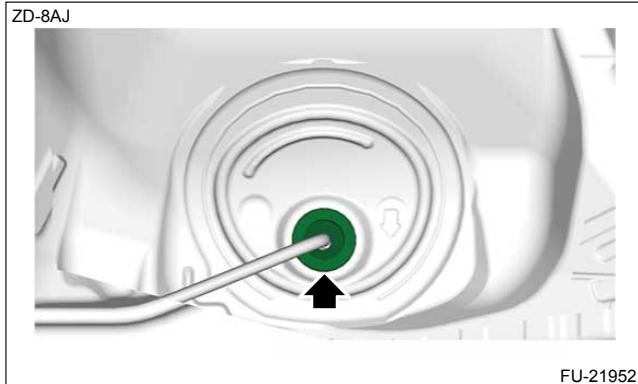
- Be careful not to spill fuel.
- Catch the fuel from the tubes using a container or cloth.
- If the fuel gauge indicates that two thirds or more of the fuel is remaining, be sure to drain fuel before starting work to avoid the fuel to spill.

Note:

- Fuel pump assembly consists of fuel pump, fuel filter and fuel level sensor.
- For the removal procedure of fuel pump, refer to "Fuel Filter". [Ref. to FUEL INJECTION \(FUEL SYSTEMS\) \(H4DO\)>Fuel Filter>REMOVAL.](#)

1. Release the fuel pressure. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel>PROCEDURE > RELEASING OF FUEL PRESSURE.](#)
2. Drain fuel. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel>PROCEDURE > DRAINING FUEL \(WITH SUBARU SELECT MONITOR\).](#)
3. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
4. Remove the cushion assembly rear seat LH. [Ref. to SEATS>Rear Seat>REMOVAL.](#)
5. Remove the service hole cover LH of fuel pump.

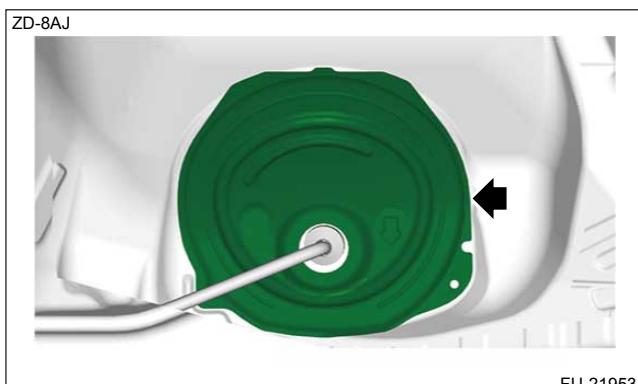
(1) Push in the grommet to remove the grommet from the service hole cover LH.



(2) Carefully remove the butyl tape and remove the service hole cover LH.

Caution:

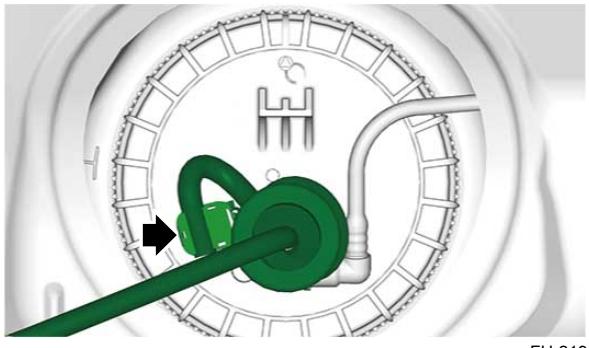
To prevent deformation of the service hole cover, use special care not to apply excessive force to the service hole cover during the work.



(3) Remove the butyl tape from the floor and the service hole cover LH.

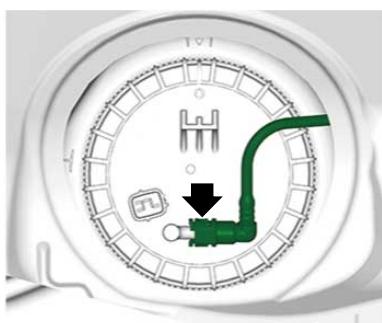
6. Disconnect the connector from fuel pump.

ZD-8AJ



7. Disconnect the fuel delivery tube. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>REMOVAL > QUICK CONNECTOR DISCONNECTION \(TYPE D\).](#)

ZD-8AJ

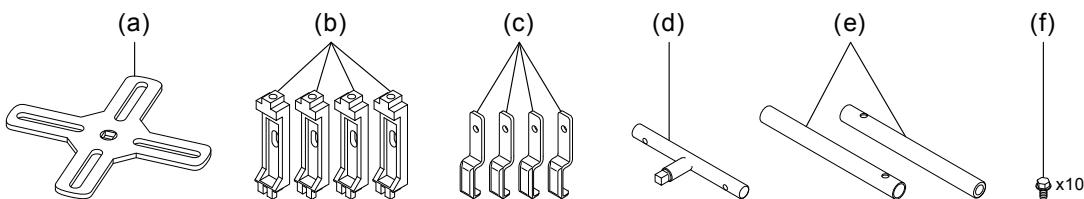


8. Remove the ring nut using the ST.

Note:

ST consists of (a), (b), (c), (d), (e) and (f).

ZD-8A*



(a) Plate

(b) Claw A

(c) Claw B

(d) T-wrench

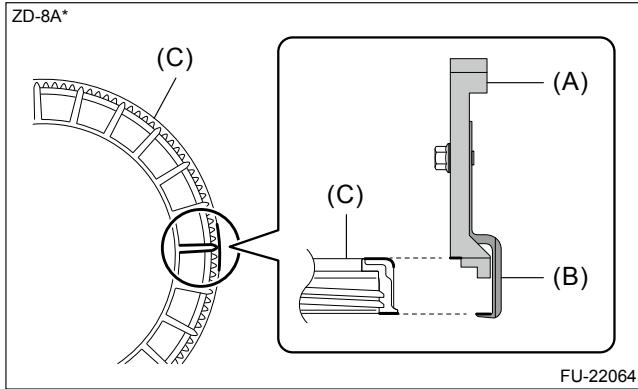
(e) Bar

(f) Bolt

Preparation tool:

ST: ST FUEL PUMP (42099CC000)

(1) Install the claw B to claw A and set the part by aligning it with the ring nut height.



(A) Claw A

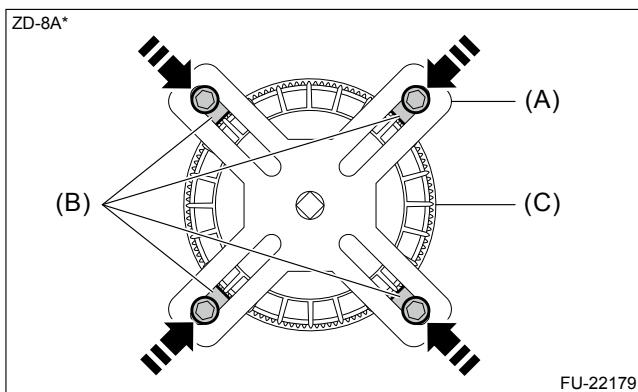
(B) Claw B

(C) Ring nut

(2) Install the claws to the plate and set the part by aligning with the ring nut.

Caution:

Set the part so that the 4 claws are evenly placed.



(A) Plate

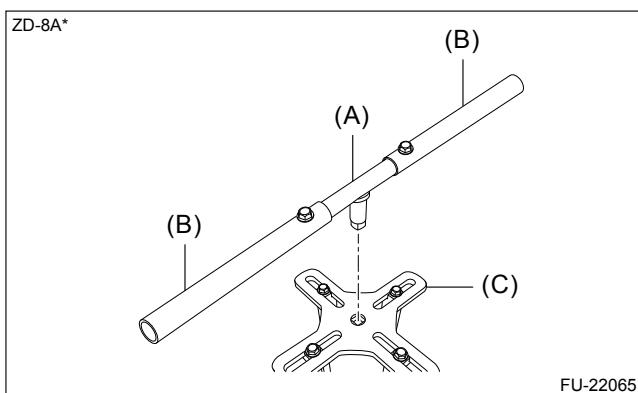
(B) Claw

(C) Ring nut

(3) Install the bar to the T-wrench and install it to the plate.

Note:

Install an extension bar of suitable length if necessary.



(A) T-wrench

(B) Bar

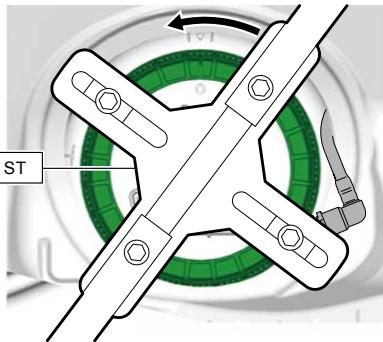
(C) Plate

(4) Remove the ring nut.

Caution:

Be careful not to damage the fuel delivery tube with the ST.

ZD-8AJ



FU-21967

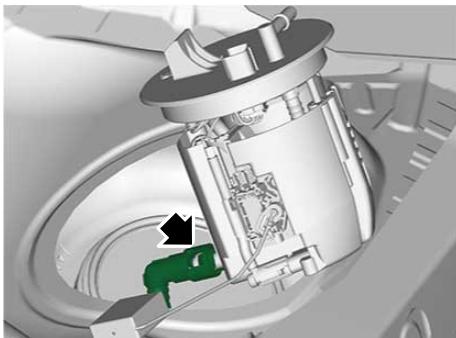
9. Take out the fuel pump assembly from the fuel tank, and disconnect the fuel sub delivery tube from the fuel pump assembly. 

[Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>REMOVAL > QUICK CONNECTOR DISCONNECTION \(TYPE D\).](#)

Caution:

Be careful not to let the arm and float of the fuel level sensor contact the fuel tank.

ZD-8AJ



FU-21968

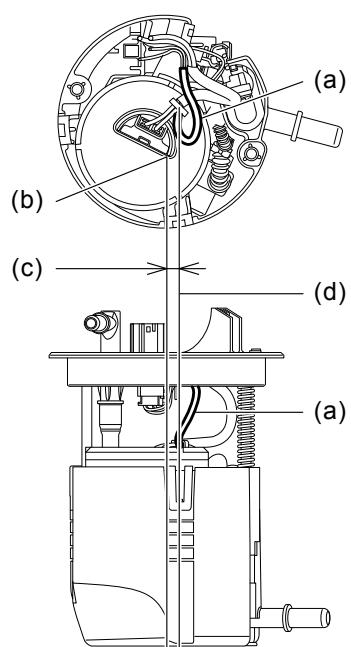
FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Pump Assembly

INSTALLATION

Caution:

- To prevent damage to the fuel level sensor harness, make sure that the fuel level sensor harness is routed outside the reference line before installing the fuel pump assembly.
- If the fuel level sensor harness is not routed outside the reference line, allow the fuel level sensor harness to retain its shape so that it is outside the line, and check that the fuel level sensor harness is at a position of 7 mm (0.28 in) or more from the datum point using a scale, etc.

ZD-8AJ



(a) Fuel level sensor harness

(b) Datum point

(c) 7 mm (0.28 in)

(d) Reference line

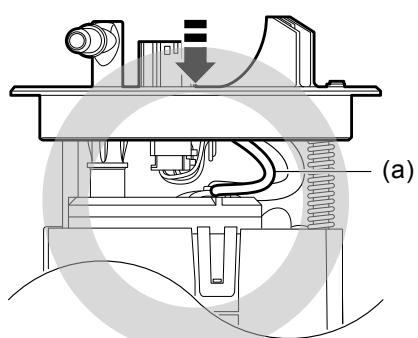
(e) Allow the fuel level sensor harness to retain its shape outside the reference line.

(f) Check that the fuel level sensor harness is at a position of 7 mm (0.28 in) or more from the datum point.

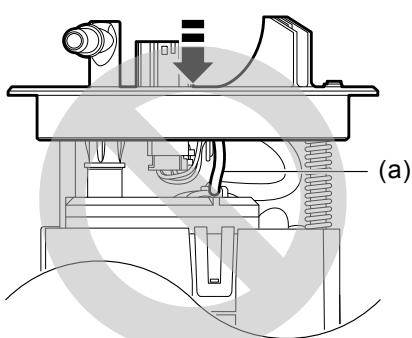
FU-22261

- When lowering the top of fuel filter, check that the fuel level sensor harness bends sideways as shown in the figure.

ZD-8AJ



○=OK



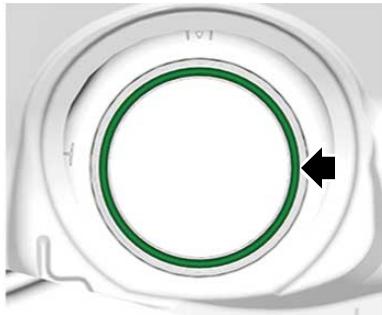
○=NG

FU-22262

(a) Fuel level sensor harness

1. Install a new gasket to the fuel tank.

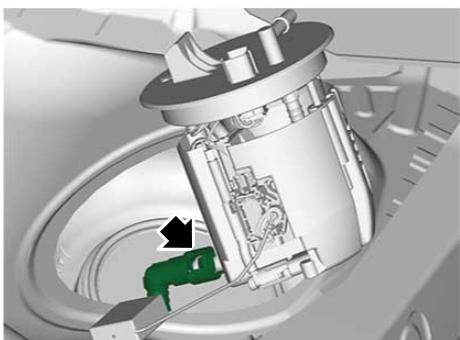
ZD-8AJ



FU-21969

2. Connect the fuel sub delivery tube to the fuel pump assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>INSTALLATION > QUICK CONNECTOR CONNECTION \(TYPE D\).](#)

ZD-8AJ



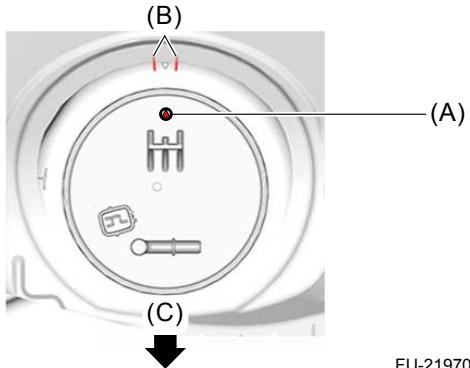
FU-21968

3. Set the fuel pump to the position shown in the figure.

Caution:

- Be careful not to spill any fuel over the gasket. If any fuel is spilled onto the gasket, wipe it off completely. Otherwise the fuel pump may rotate together with the ring nut.
- Set the arm and float of the fuel level sensor while paying attention to prevent them from contacting the fuel tank. If the arm of the fuel level sensor is bent, the fuel gauge may not read correctly.

ZD-8AJ



FU-21970

- (A) Position mark (fuel pump) (B) Fuel pump installation position (C) Front side of vehicle range mark (fuel tank)

4. Set a new ring nut plate.

ZD-8AJ



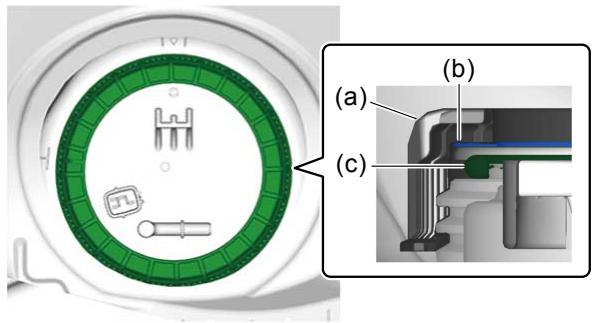
FU-21971

5. Set a new ring nut, and align the fuel tank installation start position mark (A) with the ring nut position mark (B).

Note:

- Make sure that the ring nut, ring nut plate and gasket are set as shown in the figure.

ZD-8AJ



FU-22061

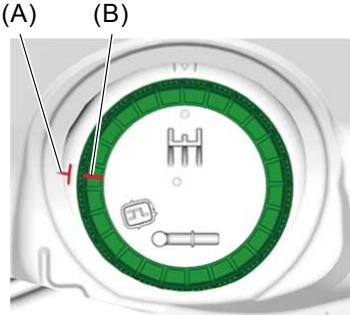
(a) Ring nut

(b) Ring nut plate

(c) Gasket

- Set the ring nut by firmly pressing against the fuel tank.

ZD-8AJ



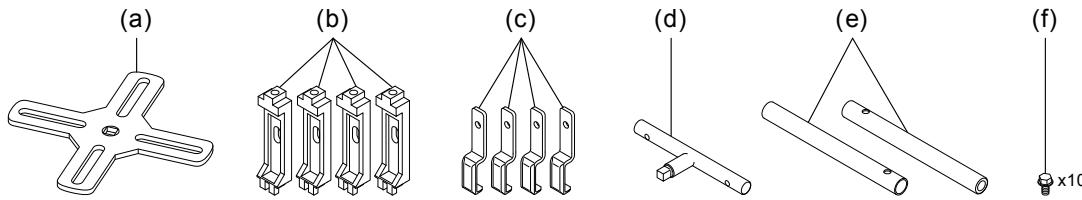
FU-21972

6. Using the ST, install the ring nut.

Note:

ST consists of (a), (b), (c), (d), (e) and (f).

ZD-8A*



FU-22176

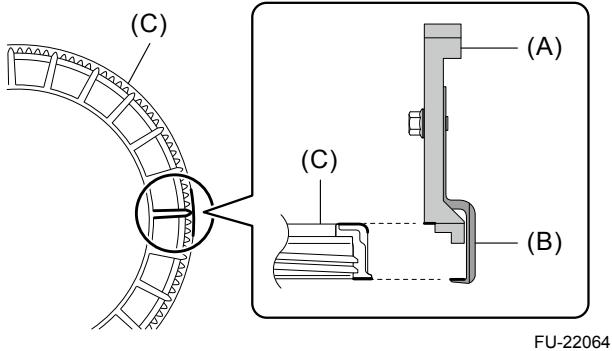
- | | | |
|------------|--------------|----------|
| (a) Plate | (c) Claw B | (e) Bar |
| (b) Claw A | (d) T-wrench | (f) Bolt |

Preparation tool:

ST: ST FUEL PUMP (42099CC000)

- (1) Install the claw B to claw A and set the part by aligning it with the ring nut height.

ZD-8A*



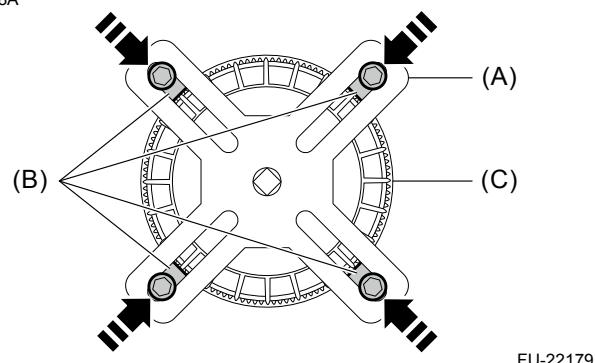
FU-22064

- (2) Install the claws to the plate and set the part by aligning with the ring nut.

Caution:

Set the part so that the 4 claws are evenly placed.

ZD-8A*

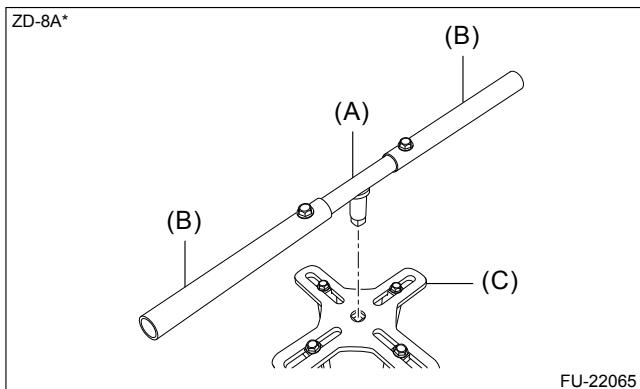


FU-22179

(3) Install the bar to the T-wrench and install it to the plate.

Note:

Install an extension bar of suitable length if necessary.



(A) T-wrench

(B) Bar

(C) Plate

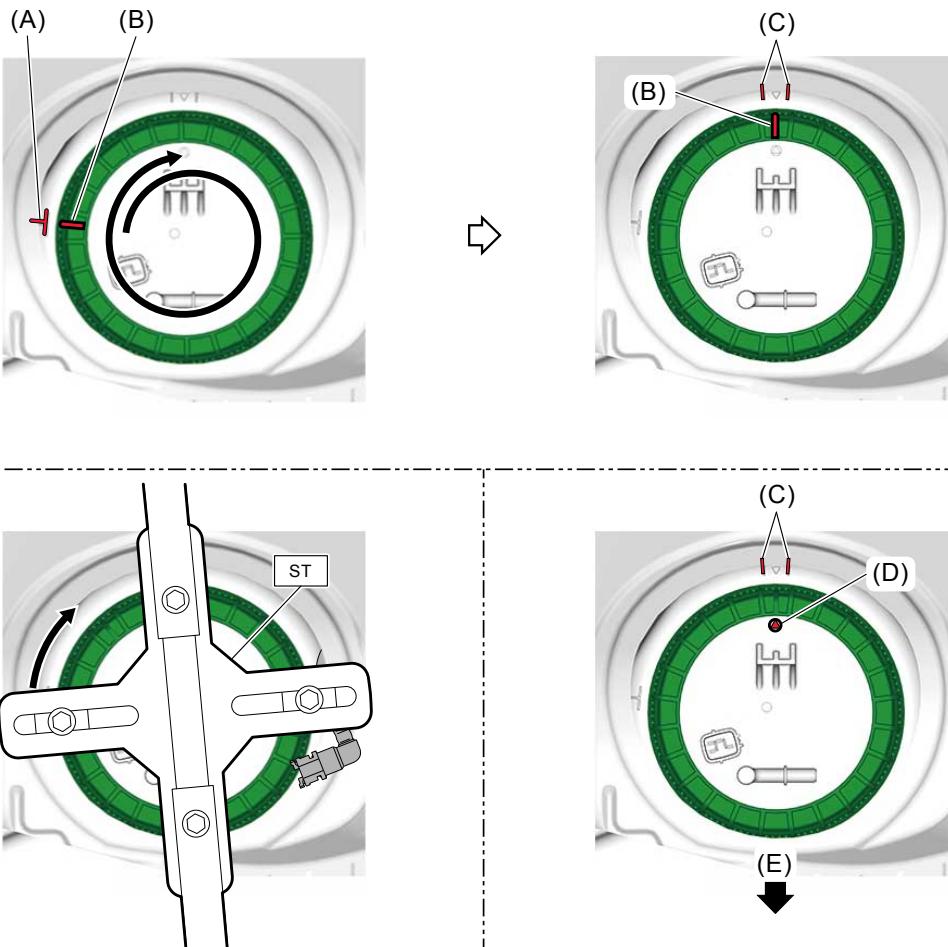
(4) Using the ST, tighten the ring nut by one turn, and then tighten until the ring nut position mark is located within the installation end position range mark on the fuel tank.

Caution:

- Be careful not to damage the fuel delivery tube with the ST.
- Make sure that the ring nut position mark is located within the installation position end range mark on the fuel tank as shown in the figure.
- Make sure that the position mark on the fuel pump is located within the installation position range mark on the fuel tank as shown in the figure.

Preparation tool:

ST: ST FUEL PUMP (42099CC000)



FU-21973

- (A) Ring nut installation position
start mark (fuel tank)
(B) Position mark (ring nut)
- (C) Ring nut installation position
end range mark (fuel tank)
(D) Position mark (fuel pump)
- (E) Front side of vehicle

- 7.** Using a caliper with depth gauge, measure the dimension (3 positions) of the ring nut and the top of fuel tank to check the tightening condition of the ring nut.

Caution:

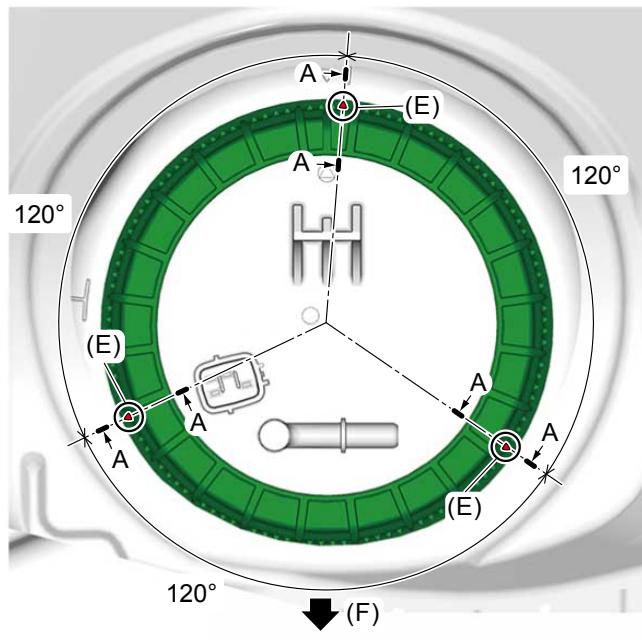
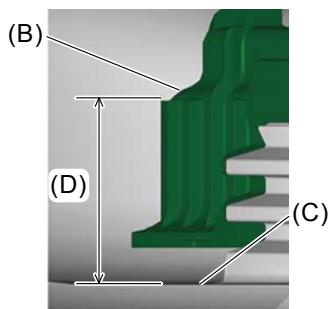
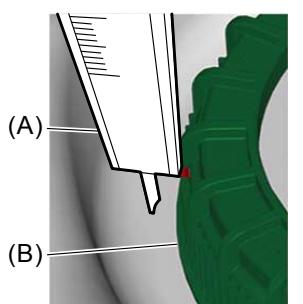
- If the measured value exceeds the standard, retighten the ring nut to correct erroneous tightening of the ring nut.
- If the ring nut and ring nut plate are deformed, cracked or damaged, replace them with new parts.

Dimension of ring nut and top of fuel tank:

Standard

21.3 – 26.3 mm (0.839 – 1.035 in)

ZD-8AJ

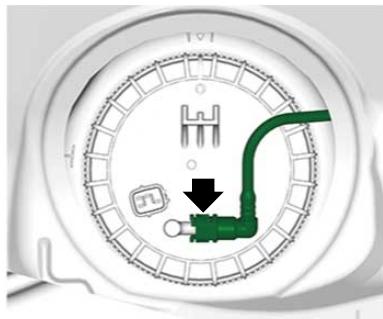


FU-21974

- (A) Caliper with depth gauge (C) Fuel tank (E) Measuring point
 (B) Ring nut (D) Dimension of ring nut and top (F) Front side of vehicle
 of fuel tank

8. Connect the fuel delivery tube. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>INSTALLATION > QUICK CONNECTOR CONNECTION \(TYPE D\).](#)

ZD-8AJ



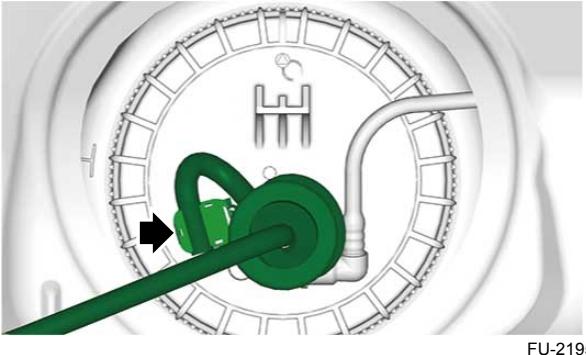
FU-21966

9. Connect the connector to the fuel pump.

Caution:

Before connecting, make sure that there are no foreign matters, water, etc. inside the connectors of fuel pump and harness. If any foreign matters, water, etc. are found, remove them with air blow and connect the connector after it has dried completely.

ZD-8AJ



10. Install the service hole cover LH of fuel pump.

- (1) Apply new butyl tape as shown in the figure.

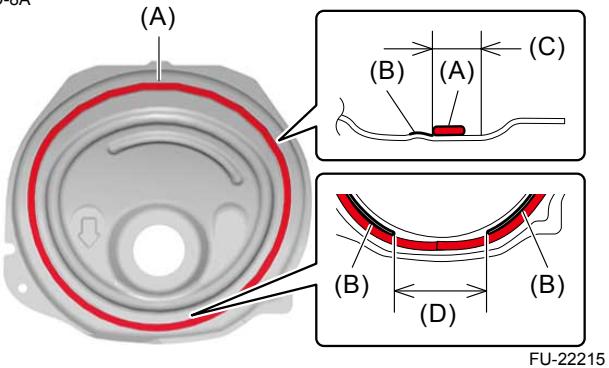
Note:

- Before applying butyl tape, degrease the attaching surface of the service hole cover.
- Apply butyl tape within the range A.
- Apply butyl tape seamlessly along the attachment guide on the service hole cover.
- Apply butyl tape so that the start and the end of application overlap within the range B shown in the figure.

Preparation items:

Butyl tape: 3M Butyl Tape 8626 or equivalent

ZD-8A*



(A) Butyl tape

(C) Range A

(D) Range B

(B) Application guide

- (2) Set the service hole cover LH to the position shown in the figure.

Note:

Before setting the service hole cover, degrease the attaching surface of the floor.

ZD-8A*



(A) Corner bead on the floor and flange of the service hole cover

(B) Floor protrusion and cutout on the service hole cover

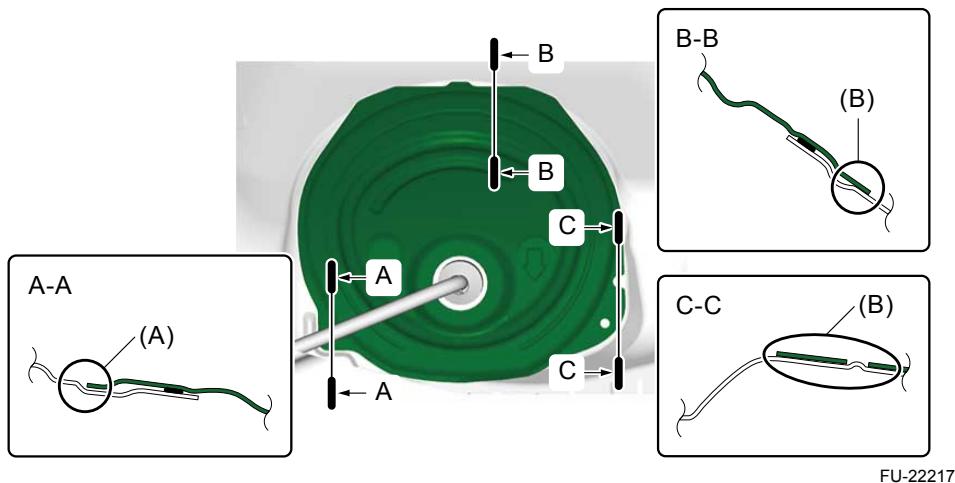
cover

(3) Install the service hole cover LH to the floor as shown in the figure.

Note:

Press hard the entire perimeter of the butyl tape attachment area on the service hole cover for secure adhesion.

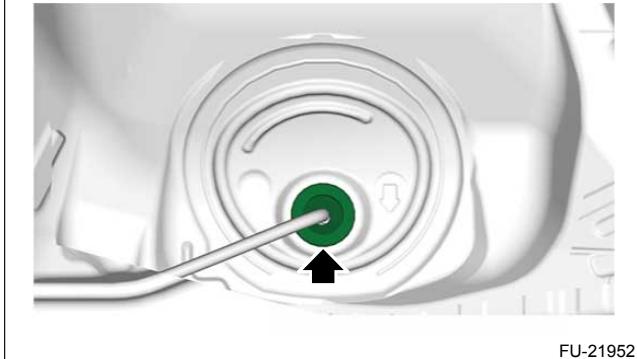
ZD-8A*



- (A) Align the height of the flange of the service hole cover with the height of the corner bead on the floor.
- (B) Closely attach the flange of the service hole cover to the floor.

(4) Install the grommet to the service hole cover LH.

ZD-8AJ



11. Install the cushion assembly rear seat LH. [Ref. to SEATS>Rear Seat>INSTALLATION.](#)

12. Connect the ground terminal to battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Pump Assembly

INSPECTION

Note:

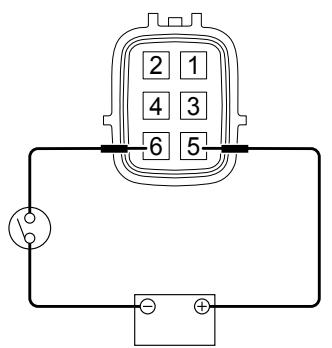
Refer to "Fuel Level Sensor" for the fuel level sensor inspection procedure. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Level Sensor>INSPECTION > FUEL PUMP SIDE.](#)

1. Check that the fuel pump has no deformation, cracks or other damages.
2. Connect the battery positive terminal to terminal No. 5 and the battery negative terminal to terminal No. 6, and inspect the fuel pump operation.

Warning:

- Wipe off fuel completely.
- Keep the battery as far apart from fuel pump as possible.
- Do not run the fuel pump for a long time under non-load condition.

ZD-8AJ



FU-22063

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Sub Level Sensor

REMOVAL



Warning:

Place "NO OPEN FLAMES" signs near the working area.

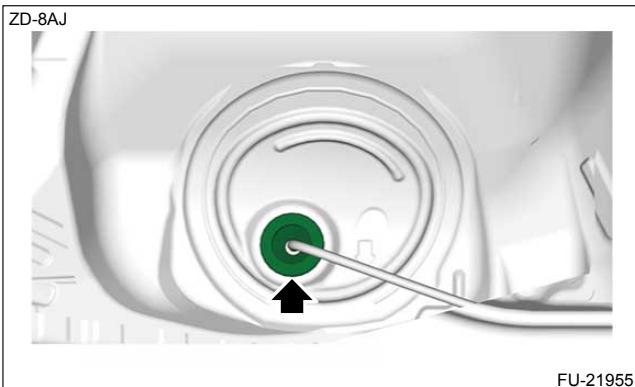
Caution:

- Be careful not to spill fuel.
- If the fuel gauge indicates that two thirds or more of the fuel is remaining, be sure to drain fuel before starting work to avoid the fuel to spill.

Note:

Fuel sub level sensor consists of fuel sub level sensor case and fuel sub level sensor.

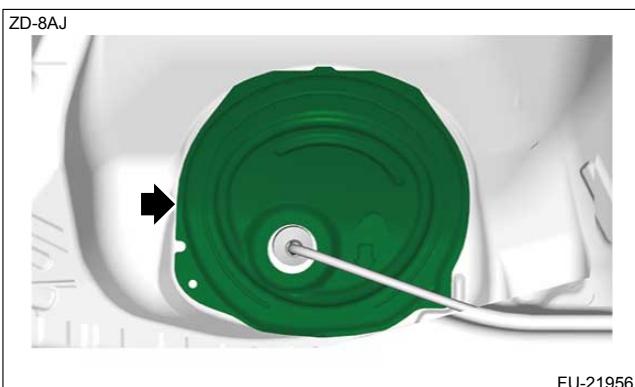
1. Release the fuel pressure. Ref. to FUEL INJECTION (FUEL SYSTEMS)(H4DO)>Fuel>PROCEDURE > RELEASING OF FUEL PRESSURE.
2. Drain fuel. Ref. to FUEL INJECTION (FUEL SYSTEMS)(H4DO)>Fuel>PROCEDURE > DRAINING FUEL (WITH SUBARU SELECT MONITOR).
3. Disconnect the ground terminal from battery sensor. Ref. to REPAIR CONTENTS>NOTE > BATTERY.
4. Remove the cushion assembly rear seat RH. Ref. to SEATS>Rear Seat>REMOVAL.
5. Remove the service hole cover RH of fuel sub level sensor.
(1) Push in the grommet to remove the grommet from the service hole cover RH.



- (2) Carefully remove the butyl tape and remove the service hole cover RH.

Caution:

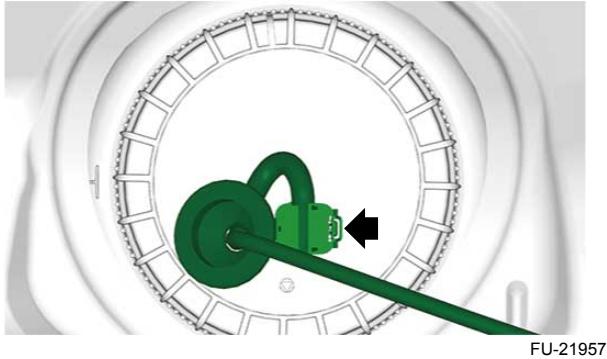
To prevent deformation of the service hole cover, use special care not to apply excessive force to the service hole cover during the work.



- (3) Remove the butyl tape from the floor and the service hole cover RH.

6. Disconnect the connector from the fuel sub level sensor.

ZD-8AJ



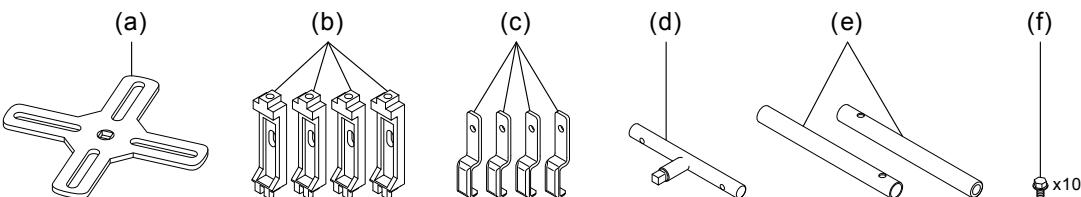
FU-21957

7. Remove the ring nut using the ST.

Note:

ST consists of (a), (b), (c), (d), (e) and (f).

ZD-8A*



FU-22176

(a) Plate
(b) Claw A

(c) Claw B
(d) T-wrench

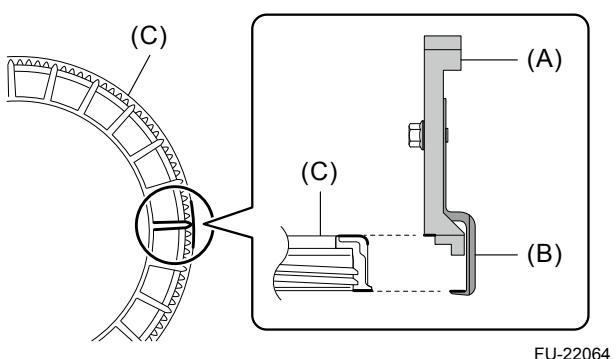
(e) Bar
(f) Bolt

Preparation tool:

ST: ST FUEL PUMP (42099CC000)

(1) Install the claw B to claw A and set the part by aligning it with the ring nut height.

ZD-8A*



(A) Claw A

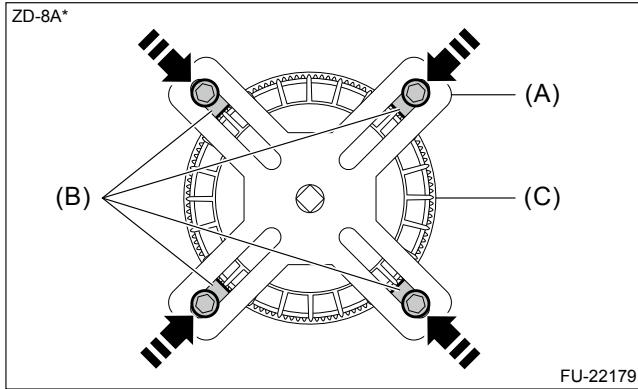
(B) Claw B

(C) Ring nut

(2) Install the claws to the plate and set the part by aligning with the ring nut.

Caution:

Set the part so that the 4 claws are evenly placed.



(A) Plate

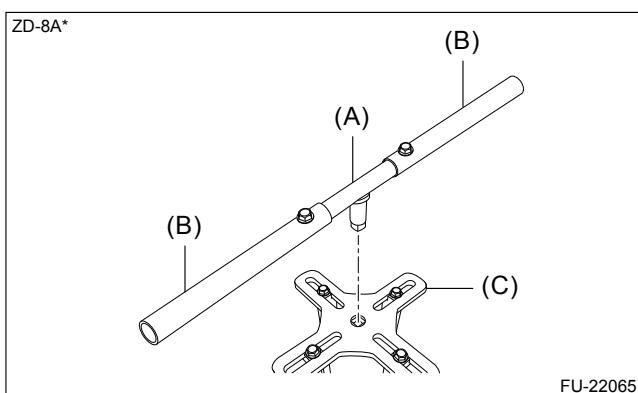
(B) Claw

(C) Ring nut

(3) Install the bar to the T-wrench and install it to the plate.

Note:

Install an extension bar of suitable length if necessary.

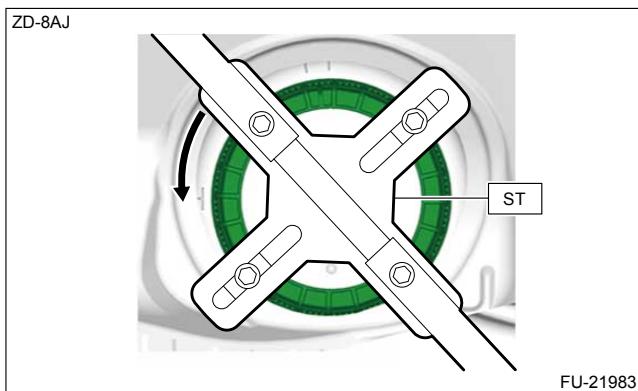


(A) T-wrench

(B) Bar

(C) Plate

(4) Remove the ring nut.



8. Take out the fuel sub level sensor from the fuel tank, and disconnect the fuel sub delivery tube from the fuel sub level sensor.
- [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>REMOVAL > QUICK CONNECTOR DISCONNECTION \(TYPE D\).](#)

Caution:

Be careful not to let the arm and float of the fuel sub level sensor contact the fuel tank during the removal.

ZD-8AJ



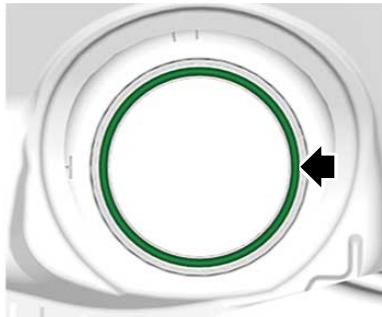
FU-21984

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Sub Level Sensor

INSTALLATION

1. Install a new gasket to the fuel tank.

ZD-8AJ



FU-21985

2. Connect the fuel sub delivery tube to the fuel sub level sensor. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>INSTALLATION > QUICK CONNECTOR CONNECTION \(TYPE D\).](#)

ZD-8AJ



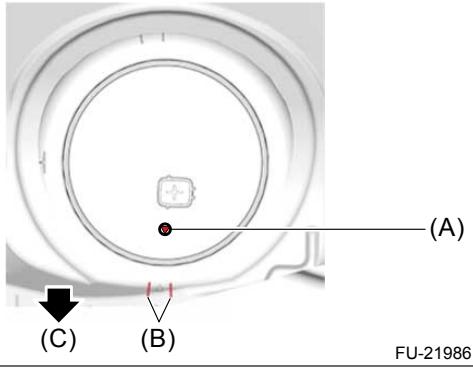
FU-21984

3. Set the fuel sub level sensor to the position shown in the figure.

Caution:

- Be careful not to spill any fuel over the gasket. If any fuel is spilled onto the gasket, wipe it off completely. Otherwise the fuel sub level sensor may rotate together with the ring nut.
- Set the fuel sub level sensor while paying attention to prevent its arm and float from contacting the fuel tank. If the arm of the fuel sub level sensor is bent, the fuel gauge may not read correctly.

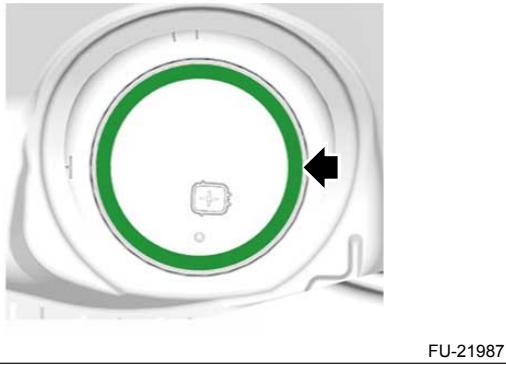
ZD-8AJ



- (A) Position mark (fuel sub level sensor)
(B) Fuel sub level sensor installation position range
(C) Front side of vehicle mark (fuel tank)

4. Set a new ring nut plate.

ZD-8AJ

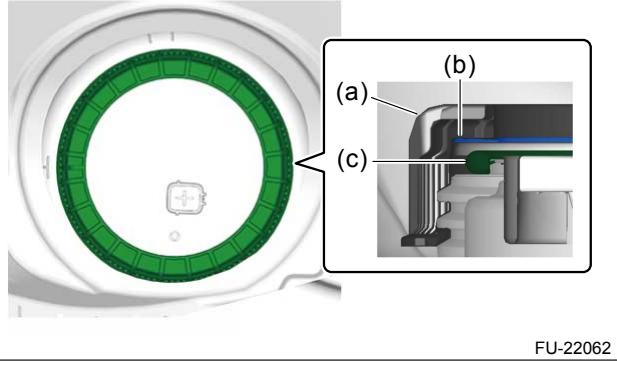


5. Set a new ring nut, and align the fuel tank installation start position mark (A) with the ring nut position mark (B).

Note:

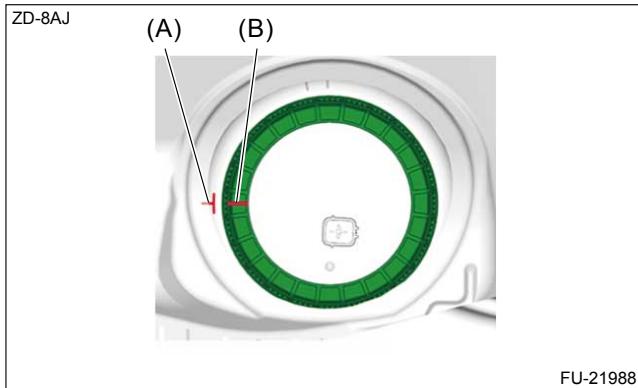
- Make sure that the ring nut, ring nut plate and gasket are set as shown in the figure.

ZD-8AJ



- (a) Ring nut (b) Ring nut plate (c) Gasket

- Set the ring nut by firmly pressing against the fuel tank.

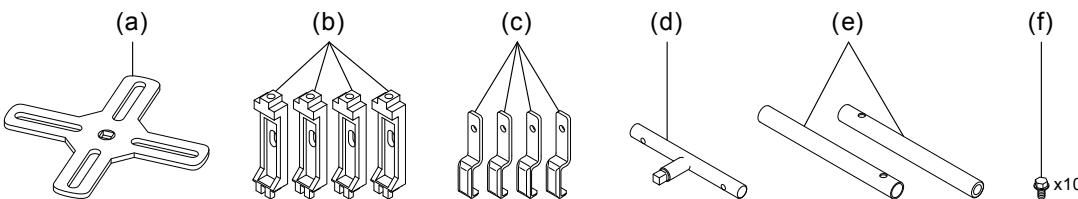


6. Using the ST, install the ring nut.

Note:

ST consists of (a), (b), (c), (d), (e) and (f).

ZD-8A*



FU-22176

(a) Plate
(b) Claw A

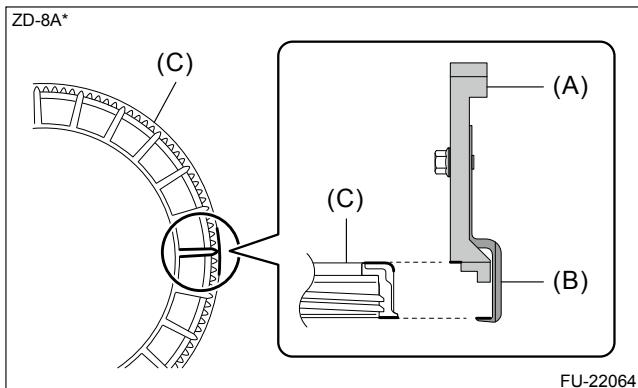
(c) Claw B
(d) T-wrench

(e) Bar
(f) Bolt

Preparation tool:

ST: ST FUEL PUMP (42099CC000)

(1) Install the claw B to claw A and set the part by aligning it with the ring nut height.



(A) Claw A

(B) Claw B

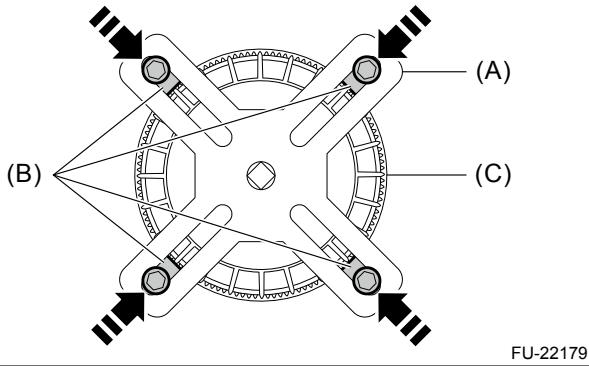
(C) Ring nut

(2) Install the claws to the plate and set the part by aligning with the ring nut.

Caution:

Set the part so that the 4 claws are evenly placed.

ZD-8A*



FU-22179

(A) Plate

(B) Claw

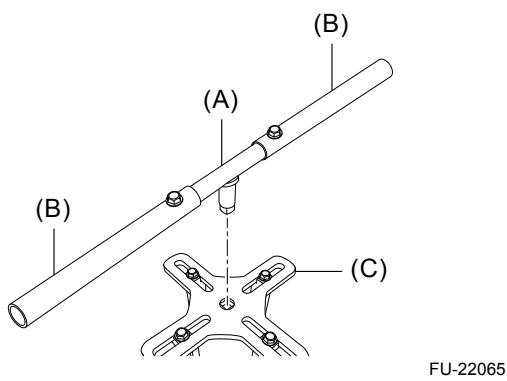
(C) Ring nut

(3) Install the bar to the T-wrench and install it to the plate.

Note:

Install an extension bar of suitable length if necessary.

ZD-8A*



FU-22065

(A) T-wrench

(B) Bar

(C) Plate

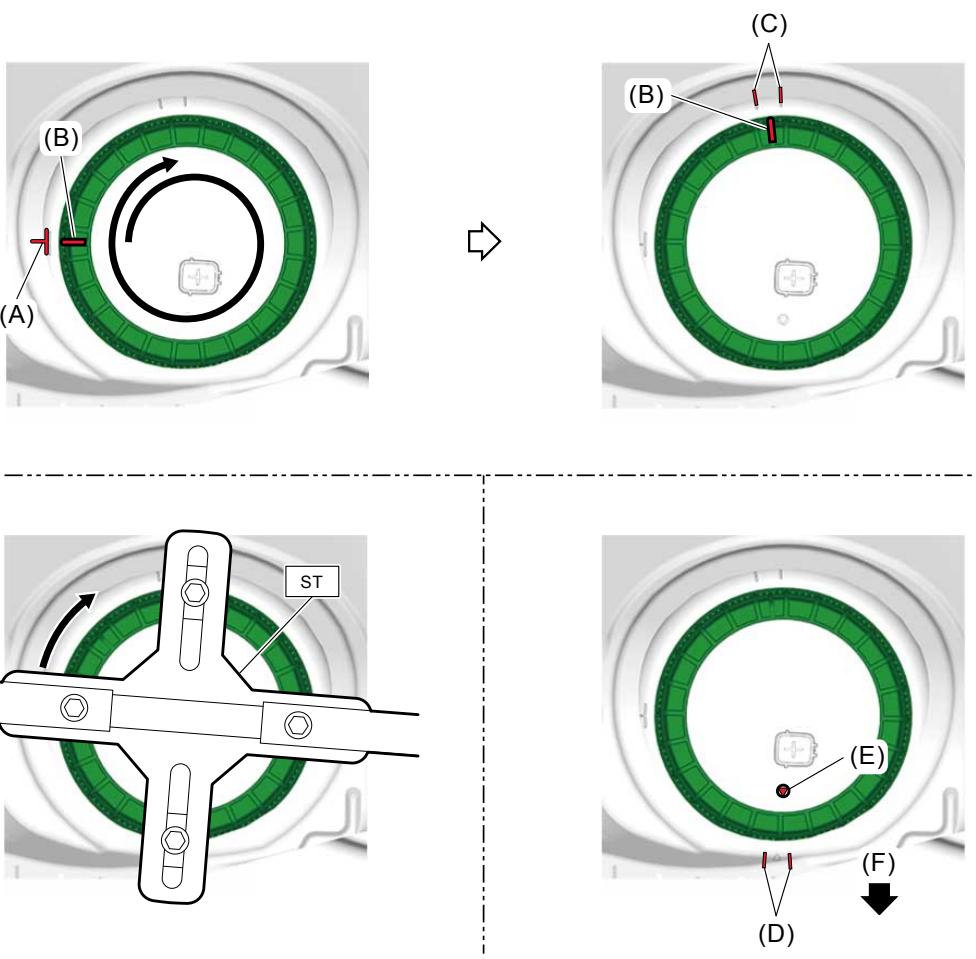
(4) Using the ST, tighten the ring nut by one turn, and then tighten until the ring nut position mark is located within the installation end position range mark on the fuel tank.

Caution:

- Be careful not to damage the fuel delivery tube with the ST.
- Make sure that the ring nut position mark is located within the installation position end range mark on the fuel tank as shown in the figure.
- Make sure that the position mark on the fuel pump is located within the installation position range mark on the fuel tank as shown in the figure.

Preparation tool:

ST: ST FUEL PUMP (42099CC000)



FU-21989

- | | | |
|--|--|--|
| (A) Ring nut installation position
start mark (fuel tank) | (C) Ring nut installation position
end range mark (fuel tank) | (E) Position mark (fuel sub level
sensor) |
| (B) Position mark (ring nut) | (D) Fuel sub level sensor
installation position range
mark (fuel tank) | (F) Front side of vehicle |

- 7.** Using a caliper with depth gauge, measure the dimension (3 positions) of the ring nut and the top of fuel tank to check the tightening condition of the ring nut.

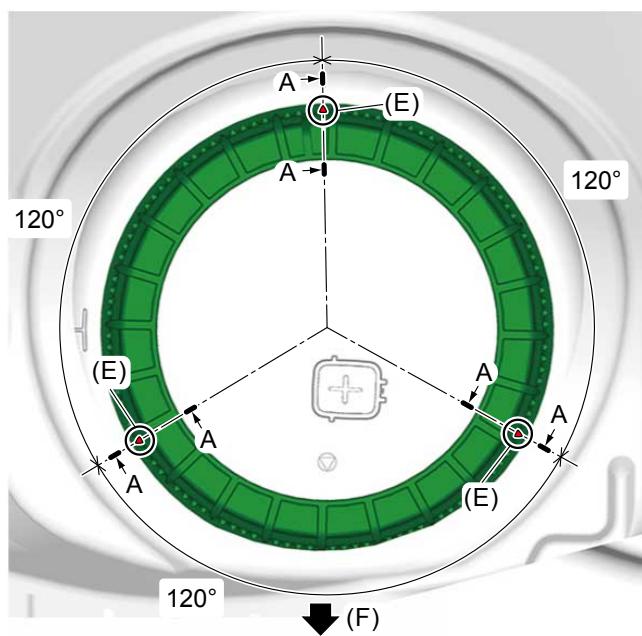
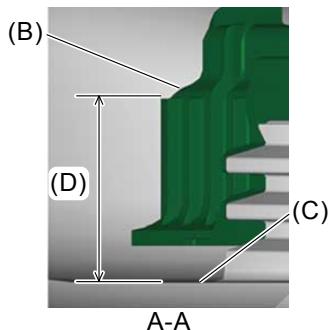
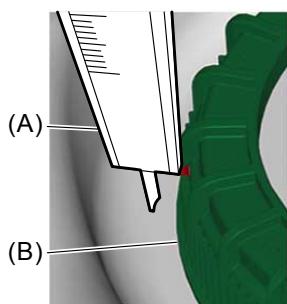
Caution:

- If the measured value exceeds the standard, retighten the ring nut to correct erroneous tightening of the ring nut.
- If the ring nut and ring nut plate are deformed, cracked or damaged, replace them with new parts.

Dimension of ring nut and top of fuel tank:**Standard**

21.3 — 26.3 mm (0.839 — 1.035 in)

ZD-8AJ



FU-21990

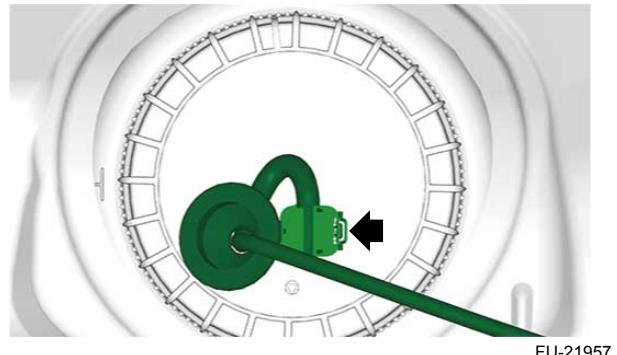
- | | | |
|------------------------------|-----------------------------------|---|
| (A) Caliper with depth gauge | (C) Fuel tank | (E) Measuring point |
| (B) Ring nut | (D) Dimension of ring nut and top | (F) Front side of vehicle
of fuel tank |

8. Connect the connector to the fuel sub level sensor.

Caution:

Before connecting, make sure that there are no foreign matters, water, etc. inside the connectors of fuel sub level sensor and harness. If any foreign matters, water, etc. are found, remove them with air blow and connect the connector after it has dried completely.

ZD-8AJ



FU-21957

9. Install the service hole cover RH of fuel sub level sensor.

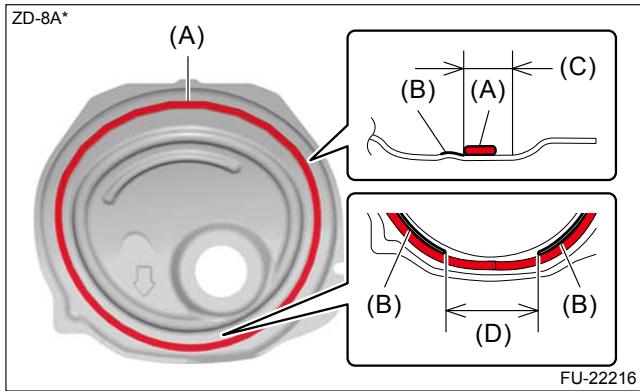
- (1) Apply new butyl tape as shown in the figure.

Note:

- Before applying butyl tape, degrease the attaching surface of the service hole cover.
- Apply butyl tape within the range A.
- Apply butyl tape seamlessly along the attachment guide on the service hole cover.
- Apply butyl tape so that the start and the end of application overlap within the range B shown in the figure.

Preparation items:

Butyl tape: 3M Butyl Tape 8626 or equivalent



- (A) Butyl tape
(B) Application guide

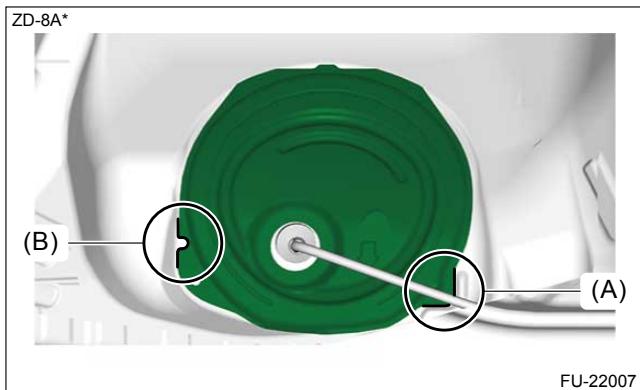
(C) Range A

(D) Range B

(2) Set the service hole cover RH to the position shown in the figure.

Note:

Before setting the service hole cover, degrease the attaching surface of the floor.

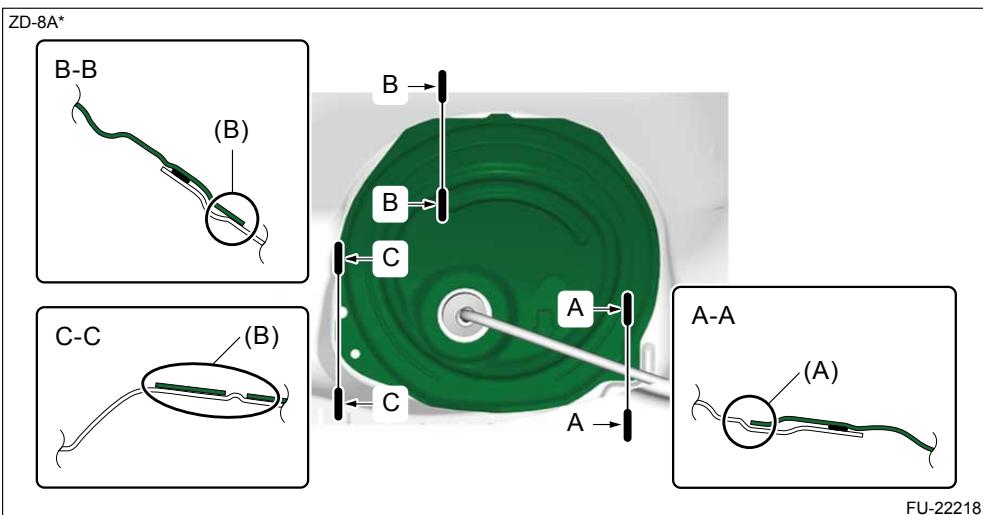


- (A) Corner bead on the floor and flange of the service hole cover
(B) Floor protrusion and cutout on the service hole cover

(3) Install the service hole cover RH to the floor as shown in the figure.

Note:

Press hard the entire perimeter of the butyl tape attachment area on the service hole cover for secure adhesion.

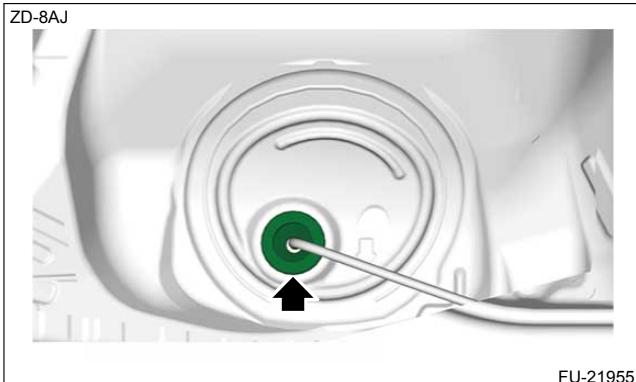


- (A) Align the height of the flange (B) Closely attach the flange of

of the service hole cover with
the height of the corner bead
on the floor.

the service hole cover to the
floor.

(4) Install the grommet to the service hole cover RH.



10. Install the cushion assembly rear seat RH. Ref. to SEATS>Rear Seat>INSTALLATION.

11. Connect the ground terminal to battery sensor. Ref. to REPAIR CONTENTS>NOTE > BATTERY.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Sub Level Sensor

INSPECTION

Note:

Refer to "Fuel Level Sensor" for the fuel sub level sensor inspection procedure. Ref. to FUEL INJECTION (FUEL SYSTEMS)(H4DO)>Fuel Level Sensor>INSPECTION > FUEL SUB LEVEL SENSOR SIDE.

Check that the fuel sub level sensor case has no deformation, cracks or other damages.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Level Sensor

REMOVAL

Warning:

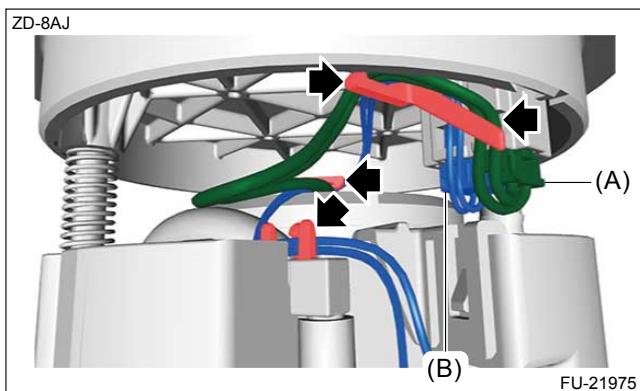
Place "NO OPEN FLAMES" signs near the working area.

Caution:

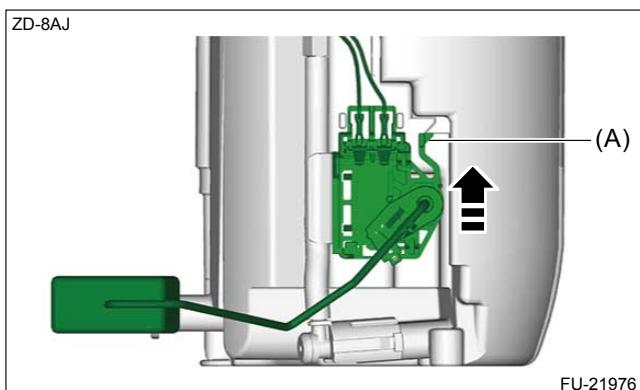
- Be careful not to spill fuel.
- If the fuel gauge indicates that two thirds or more of the fuel is remaining, be sure to drain fuel before starting work to avoid the fuel to spill.

1. FUEL PUMP SIDE

1. Remove the fuel pump assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Pump Assembly>REMOVAL.](#)
2. Disconnect the fuel pump connector (A) and fuel level sensor connector (B), and pull out the connector cable and fuel level sensor harness from the clip.

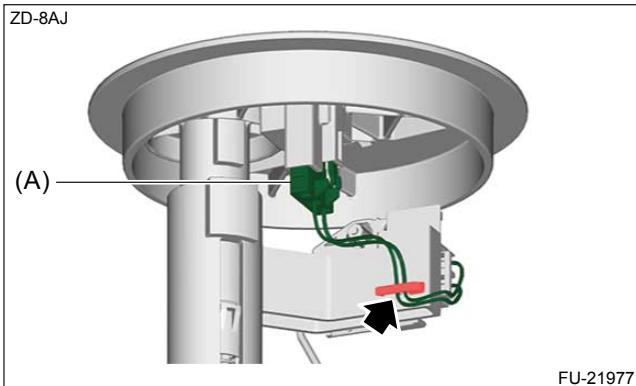


3. Press the claw (A) of the fuel level sensor to unlock, and slide the fuel level sensor in the direction of the arrow to remove the fuel level sensor.

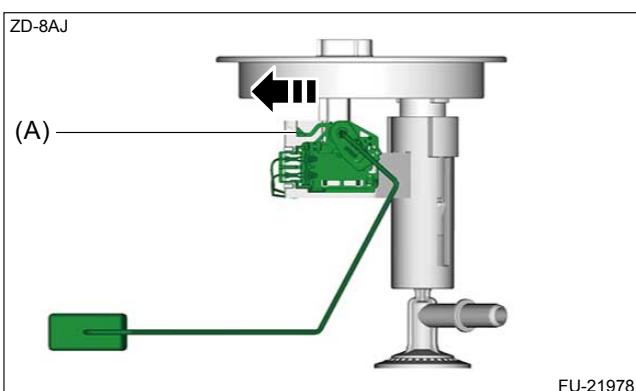


2. FUEL SUB LEVEL SENSOR SIDE

1. Remove the fuel sub level sensor. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Sub Level Sensor>REMOVAL.](#)
2. Disconnect the connector (A) of the fuel sub level sensor and pull out the fuel sub level sensor harness from the clip.



3. Press the claw (A) of the fuel sub level sensor to unlock, and slide the fuel sub level sensor in the direction of the arrow to remove the fuel sub level sensor.



FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Level Sensor

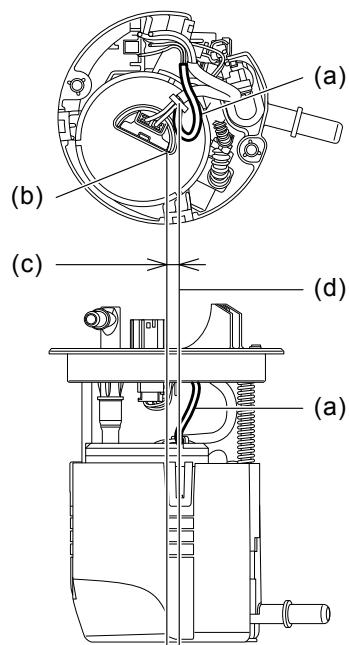
INSTALLATION

1. FUEL PUMP SIDE

Caution:

- To prevent damage to the fuel level sensor harness, make sure that the fuel level sensor harness is routed outside the reference line before installing the fuel pump assembly.
- If the fuel level sensor harness is not routed outside the reference line, allow the fuel level sensor harness to retain its shape so that it is outside the line, and check that the fuel level sensor harness is at a position of 7 mm (0.28 in) or more from the datum point using a scale, etc.

ZD-8AJ



(a) Fuel level sensor harness

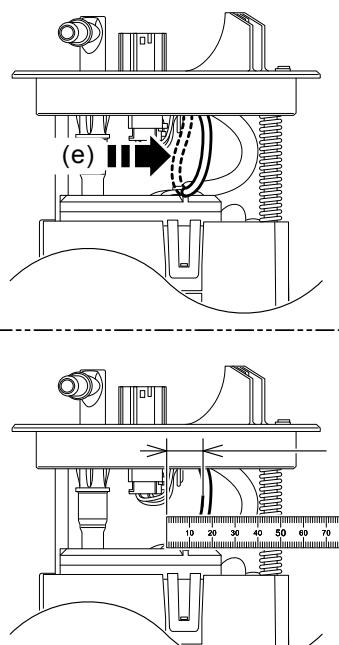
(b) Datum point

(c) 7 mm (0.28 in)

(d) Reference line

(e) Allow the fuel level sensor harness to retain its shape outside the reference line.

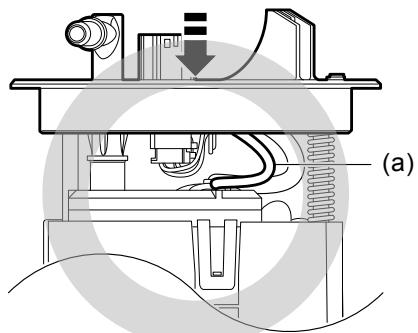
(f) Check that the fuel level sensor harness is at a position of 7 mm (0.28 in) or more from the datum point.



FU-22261

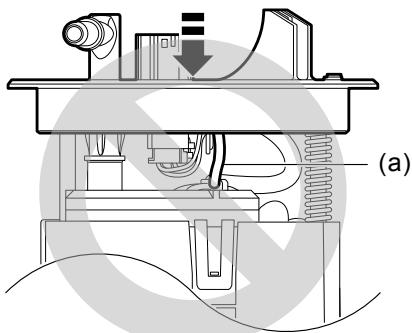
- When lowering the top of fuel filter, check that the fuel level sensor harness bends sideways as shown in the figure.

ZD-8AJ



○=OK

(a) Fuel level sensor harness



ⓧ=NG

FU-22262

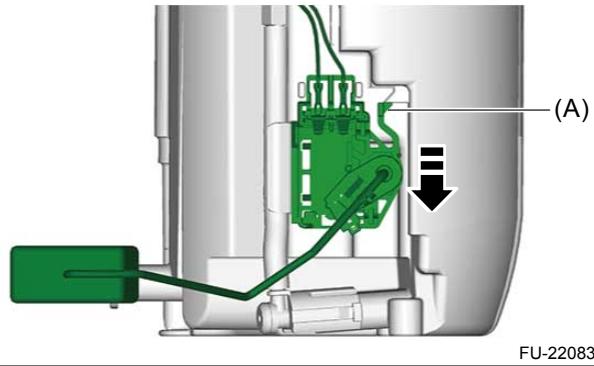
- Install the fuel level sensor to the fuel pump assembly.

Caution:

Be sure to install the fuel level sensor harness to the clip first, then install the connector cable. Otherwise, malfunction may occur.

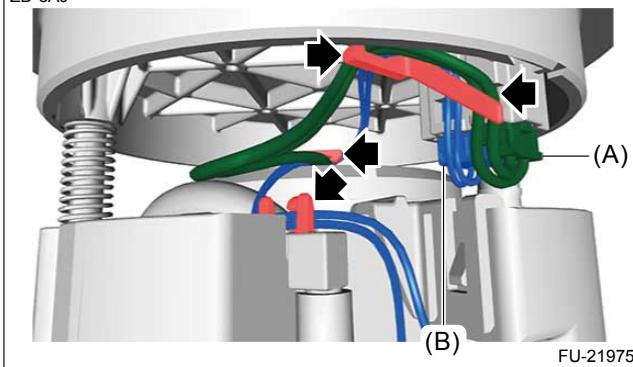
- Install the fuel level sensor and confirm that the claw (A) is locked securely.

ZD-8AJ



- (2) Install the fuel level sensor harness and connector cable to the clip, and connect the fuel level sensor connector (B) and fuel pump connector (A).

ZD-8AJ



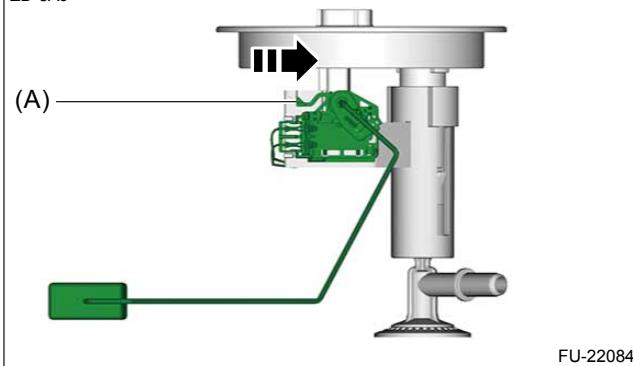
2. Install the fuel pump assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Pump Assembly>INSTALLATION.](#)

2. FUEL SUB LEVEL SENSOR SIDE

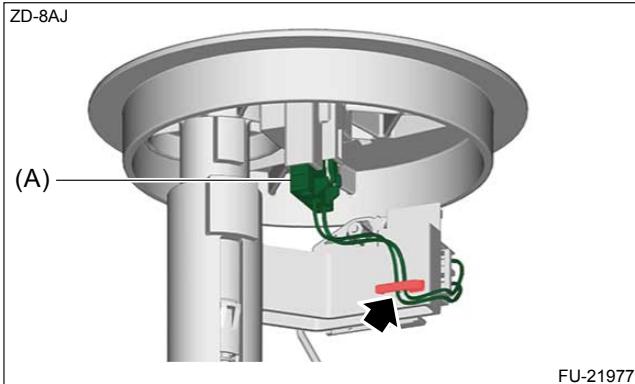
1. Install the fuel sub level sensor to the fuel sub level sensor case.

- (1) Install the fuel sub level sensor and confirm that the claw (A) is locked securely.

ZD-8AJ



- (2) Connect the fuel sub level sensor harness to the clip and connect the connector (A).



2. Install the fuel sub level sensor. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Sub Level Sensor>INSTALLATION.](#)

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Level Sensor

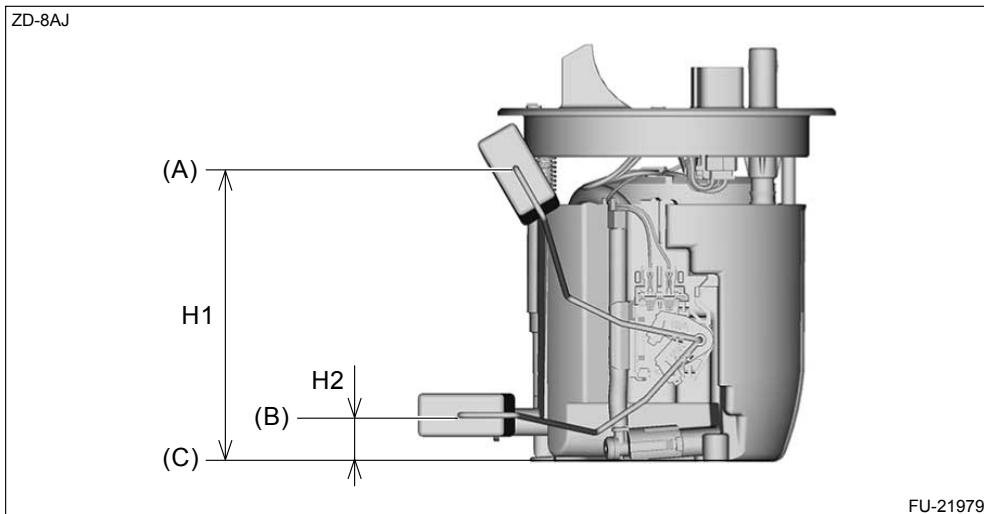
INSPECTION

1. FUEL PUMP SIDE

1. Check that the fuel level sensor has no damage.
2. Measure the fuel level sensor float position.

Note:

When inspecting the fuel level sensor, perform the work with the sensor installed to the fuel pump.



(A) FULL

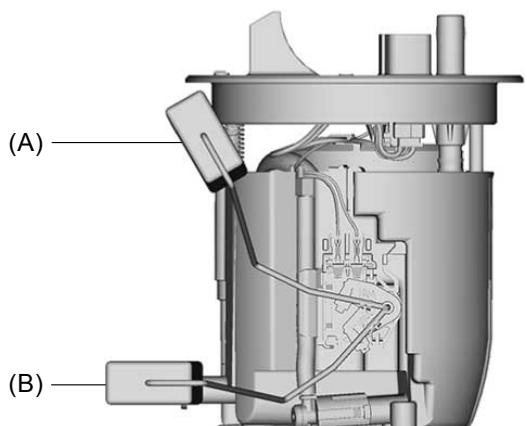
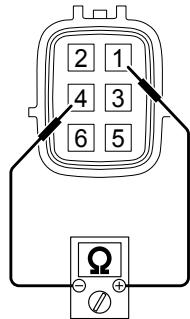
(B) EMPTY

(C) Fuel tank seating surface

Float position	Standard
FULL — Fuel tank seating surface H1	114.7 — 122.7 mm (4.516 — 4.831 in)
EMPTY — Fuel tank seating surface H2	14.7 — 22.7 mm (0.579 — 0.894 in)

3. Check the resistance between fuel level sensor terminals by the connector on top of the fuel pump.

ZD-8AJ



FU-21980

Float position	Terminal No.	Standard
FULL (A)	1 – 4	6.5 – 8.5 Ω
EMPTY (B)		157.9 – 161.9 Ω

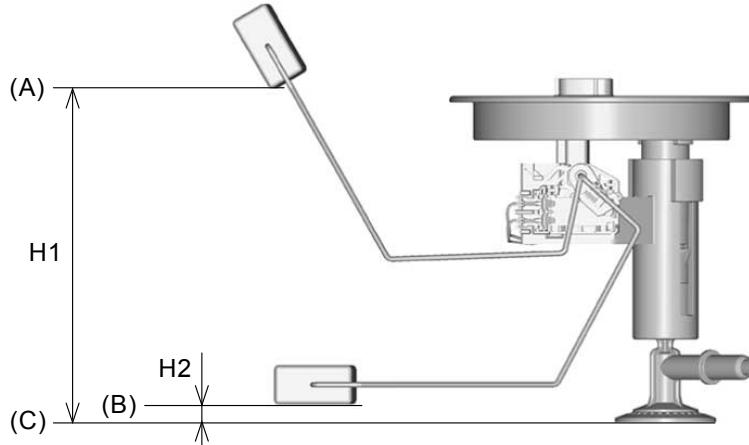
2. FUEL SUB LEVEL SENSOR SIDE

1. Check that the fuel sub level sensor has no damage.
2. Check the fuel sub level sensor float position.

Note:

When inspecting the fuel sub level sensor, perform the work with the sensor installed to the fuel sub level sensor case.

ZD-8AJ



FU-21981

(A) FULL

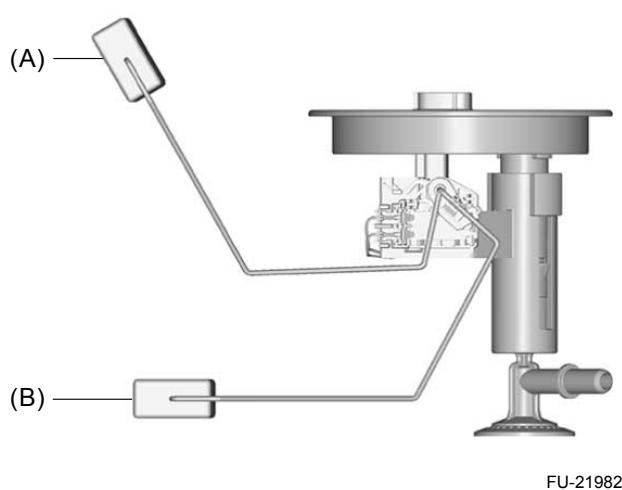
(B) EMPTY

(C) Fuel tank seating surface

Float position	Standard
FULL — Fuel tank seating surface H1	153.6 – 162.6 mm (6.047 – 6.402 in)
EMPTY — Fuel tank seating surface H2	4.05 – 13.05 mm (0.159 – 0.514 in)

3. Check the resistance between fuel sub level sensor terminals by the connector on top of the fuel sub level sensor.

ZD-8AJ



FU-21982

Float position	Terminal No.	Standard
FULL (A)	1 – 2	6.5 – 8.5 Ω
EMPTY (B)		247.6 – 252.6 Ω

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Filter

REMOVAL



Warning:

Place "NO OPEN FLAMES" signs near the working area.

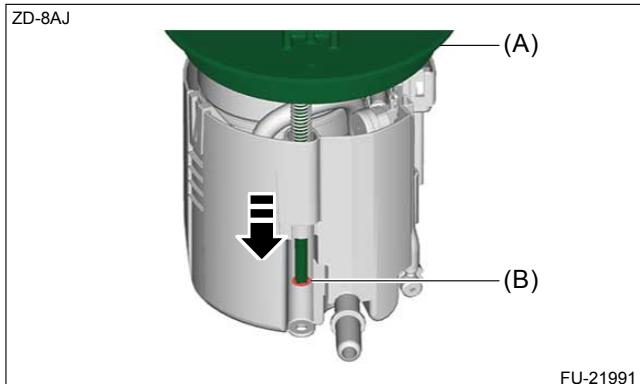
Caution:

- Be careful not to spill fuel.
- If the fuel gauge indicates that two thirds or more of the fuel is remaining, be sure to drain fuel before starting work to avoid the fuel to spill.
- Be careful not to drop or apply any impact to the fuel pump during work. This may deteriorate its performance.

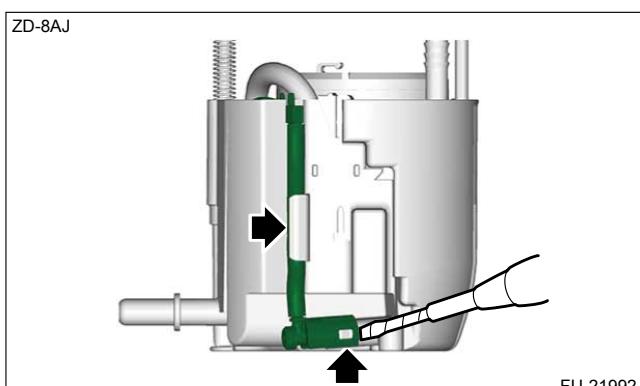
Note:

The fuel filter is built in fuel pump assembly.

1. Remove the fuel pump assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Pump Assembly>REMOVAL.](#)
2. Remove the fuel level sensor. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Level Sensor>REMOVAL > FUEL PUMP SIDE.](#)
3. Push the fuel filter assembly (A) in the direction of the arrow to compress, and detach the connecting clip (B).

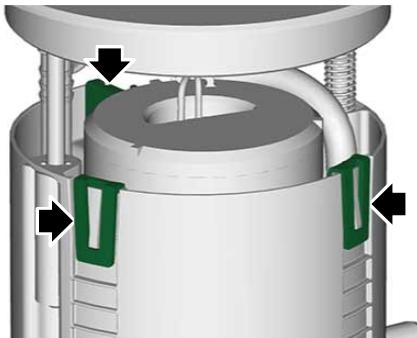


4. Release the claw using a flat tip screwdriver or similar tool wrapped with a protection tape, and remove the tube assembly from the fuel chamber assembly.



5. Disengage three claws on the fuel pump holder from the fuel chamber assembly, and remove the fuel filter assembly.

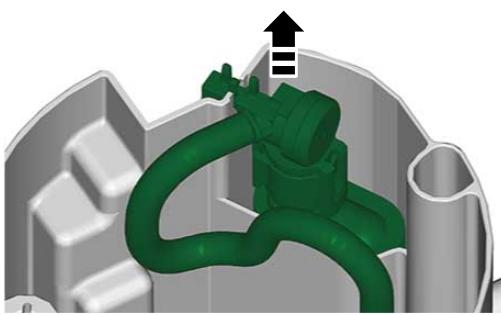
ZD-8AJ



FU-21993

6. Remove the jet pump from the fuel chamber assembly.

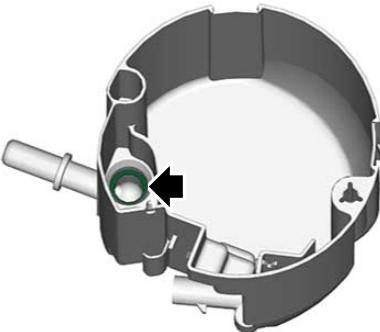
ZD-8AJ



FU-21994

7. Remove the O-ring from the fuel chamber assembly.

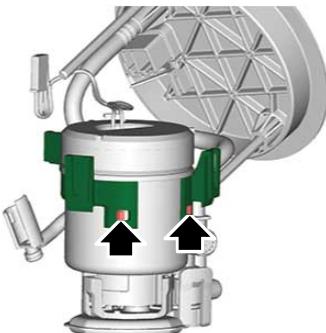
ZD-8AJ



FU-21995

8. Remove the fuel pump holder.

ZD-8AJ



FU-21996

9. Disengage five claws on the fuel pump.

ZD-8AJ



FU-21997

10. Remove the fuel pump from the fuel filter assembly.

Caution:

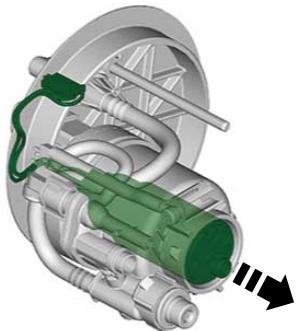
If O-rings remain on the fuel filter assembly side, they must be carefully removed using a precision screwdriver or similar tool wrapped with a protection tape.

ZD-8AJ



FU-21999

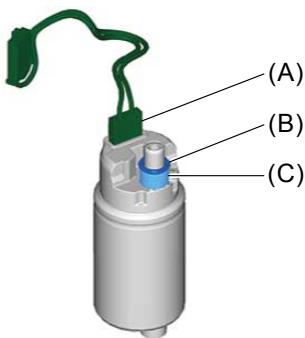
ZD-8AJ



FU-21998

11. Remove the connector cable (A), O-ring (B) and spacer (C) from the fuel pump.

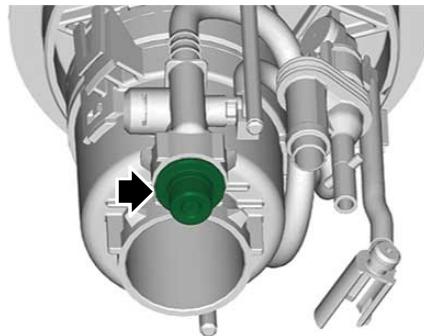
ZD-8AJ



FU-22000

12. Remove the pressure regulator from the fuel filter assembly.

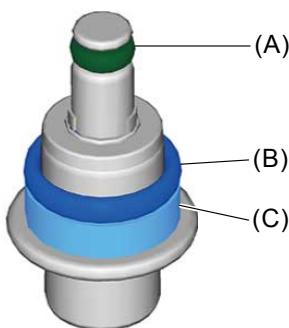
ZD-8AJ



FU-22001

- 13.** Remove the O-ring (A), O-ring (B), and backup ring (C) from the pressure regulator.

VN-5AJ



FU-21795

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Filter

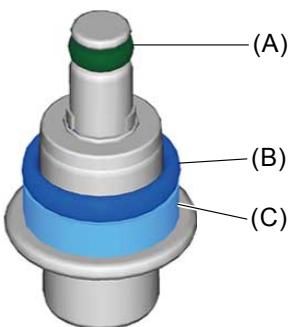
INSTALLATION

- 1.** Install backup ring (C), new O-ring (B) and new O-ring (A) to the pressure regulator.

Note:

Apply gasoline to the O-ring and backup ring.

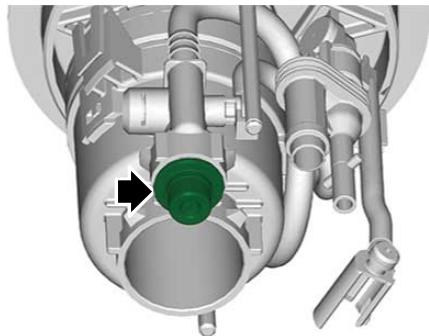
VN-5AJ



FU-21795

- 2.** Install the pressure regulator to the fuel filter assembly.

ZD-8AJ



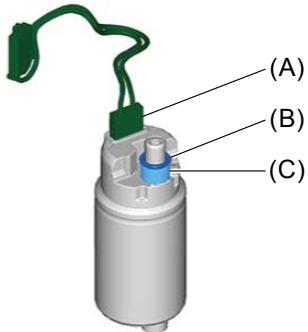
FU-22001

3. Install the spacer (C), a new O-ring (B), and a new connector cable (A) to the fuel pump.

Note:

Apply gasoline to the O-ring and backup ring.

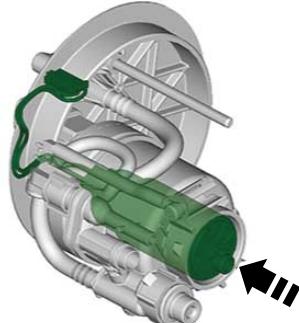
ZD-8AJ



FU-22000

4. Set the fuel pump to the fuel filter assembly.

ZD-8AJ



FU-22184

5. Install the fuel pump to the fuel filter assembly.

Note:

After installation, make sure 5 claws are securely engaged in each position.

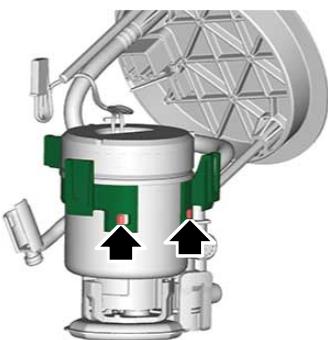
ZD-8AJ



FU-21997

6. Install the fuel pump holder.

ZD-8AJ



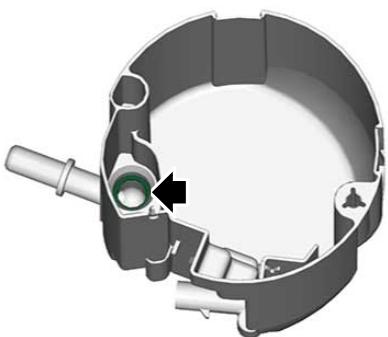
FU-21996

7. Install a new O-ring to the fuel chamber assembly.

Note:

Apply gasoline to the O-ring.

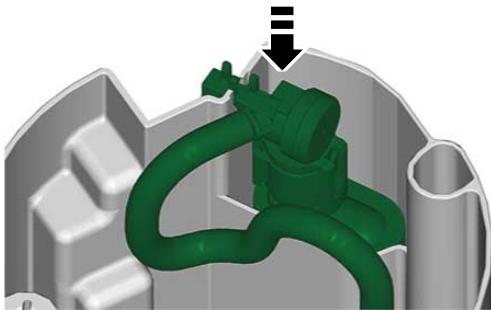
ZD-8AJ



FU-21995

8. Install the jet pump to the fuel chamber assembly.

ZD-8AJ



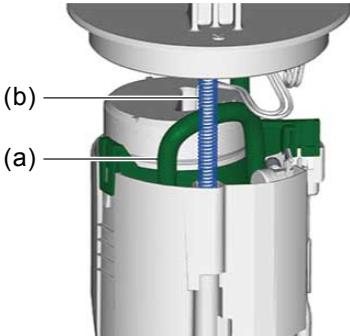
FU-22002

9. Install the fuel filter assembly to the fuel chamber assembly.

Note:

- Set the tube (a) and spring (b) for the fuel filter assembly as shown in the figure.

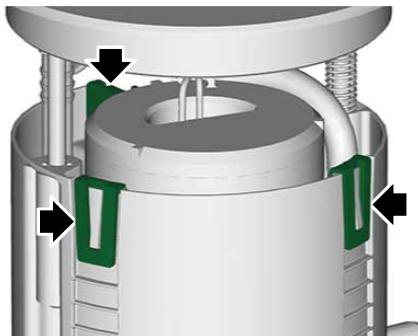
ZD-8AJ



FU-22003

- Check that the claws fastening the fuel camber assembly and the fuel filter assembly are securely engaged.

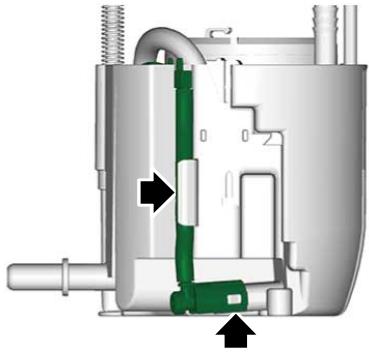
ZD-8AJ



FU-21993

10. Connect the tube assembly to the fuel chamber assembly.

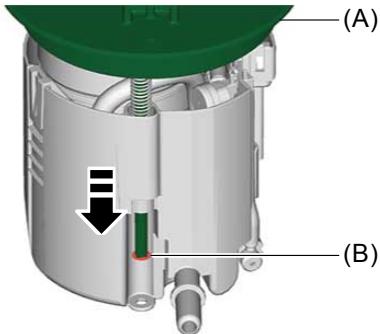
ZD-8AJ



FU-22004

11. Push the fuel filter assembly (A) in the direction of the arrow to compress, and attach a new clip (B).

ZD-8AJ



FU-21991

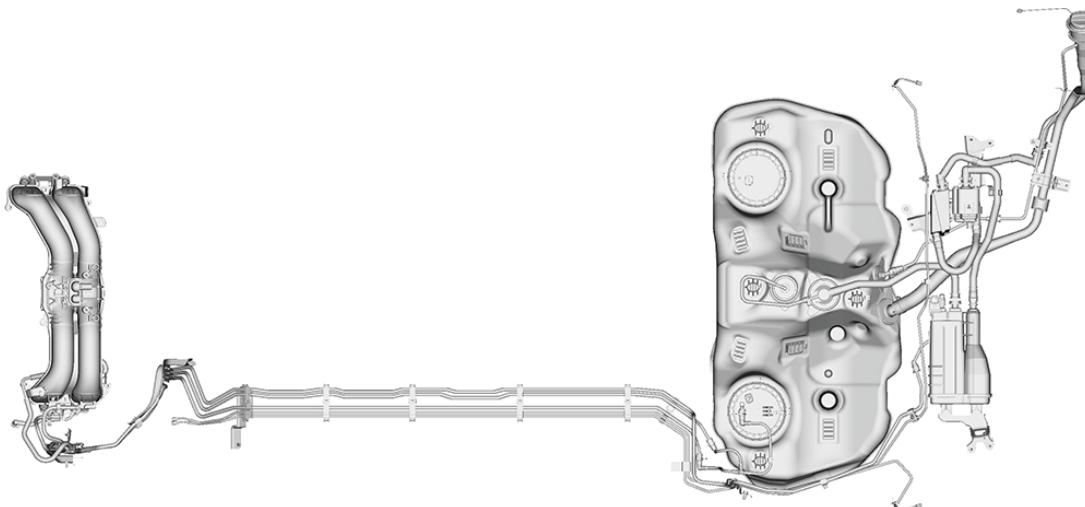
12. Install the fuel level sensor. Ref. to FUEL INJECTION (FUEL SYSTEMS)(H4DO)>Fuel Level Sensor>INSTALLATION > FUEL

PUMP SIDE.

- 13.** Inspect the fuel level sensor.  Ref. to FUEL INJECTION (FUEL SYSTEMS)(H4DO)>Fuel Level Sensor>INSPECTION > FUEL PUMP SIDE.
- 14.** Install the fuel pump assembly.  Ref. to FUEL INJECTION (FUEL SYSTEMS)(H4DO)>Fuel Pump Assembly>INSTALLATION.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Delivery and Evaporation Lines

REMOVAL



FU-22119

Warning:

Place "NO OPEN FLAMES" signs near the working area.

Caution:

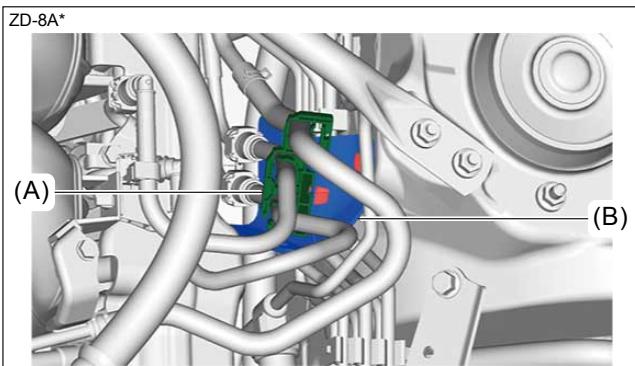
Be careful not to spill fuel.

1. Release the fuel pressure. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel>PROCEDURE > RELEASING OF FUEL PRESSURE.](#)
2. Drain fuel. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel>PROCEDURE > DRAINING FUEL \(WITH SUBARU SELECT MONITOR\).](#)
3. Disconnect the ground terminal from battery sensor. [Ref. to REPAIR CONTENTS>NOTE > BATTERY.](#)
4. Open the fuel filler lid and remove the fuel filler cap.

Note:

This operation is required to release the inner pressure of the fuel tank.

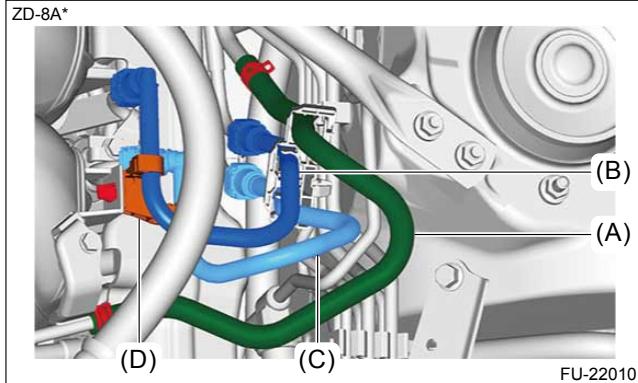
5. Remove the fuel delivery tube clamp (A) and the fuel protector (B).



FU-22011

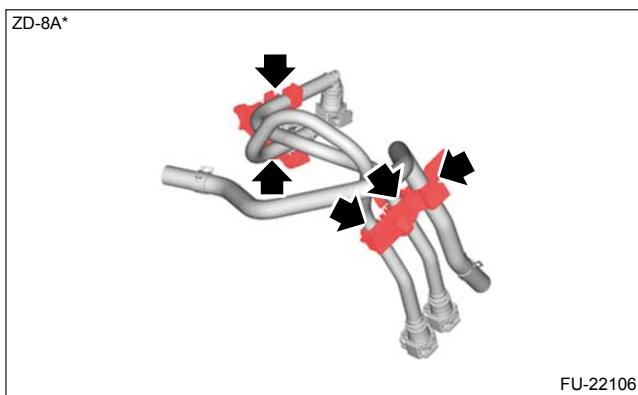
6. Disconnect the evaporation hose (A).

7. Disconnect the fuel delivery tube (cylinder direct injection side) (B) and fuel delivery tube (port injection side) (C).  [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>REMOVAL > QUICK CONNECTOR DISCONNECTION \(TYPE A\).](#)
8. Remove the fuel delivery tube clamp (D), and remove the evaporation hose and the fuel delivery tube as a single unit.



9. Remove the fuel delivery tube clamp.

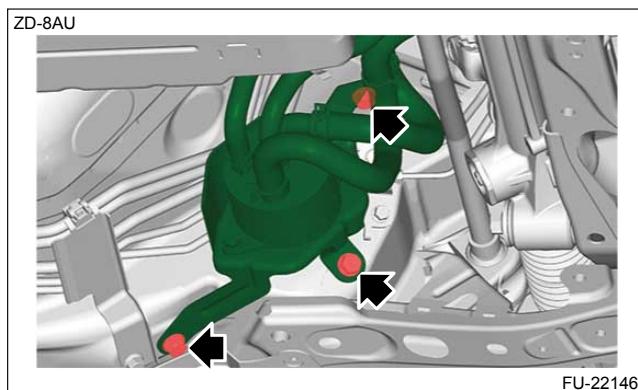
Note:
Perform this procedure only when required.



10. Lift up the vehicle.

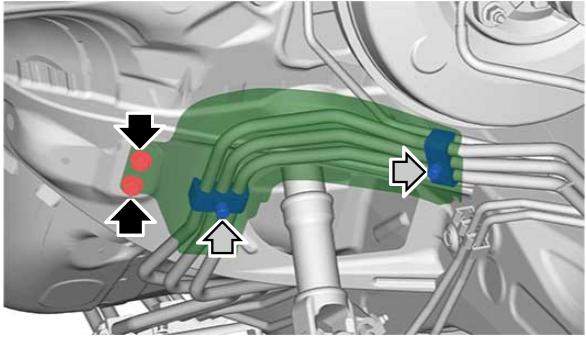
11. Remove the sub frame front LWR C COMPL LH.  [Ref. to FRONT SUSPENSION>Sub Frame>REMOVAL.](#)

12. Remove the bolts which secure the ATF cooler (with warmer feature), and move it at the locations that do not interfere operation.
(AT model)



13. Remove the pipe protector and remove the pipe clamp from the fuel pipe assembly.

ZD-8AU



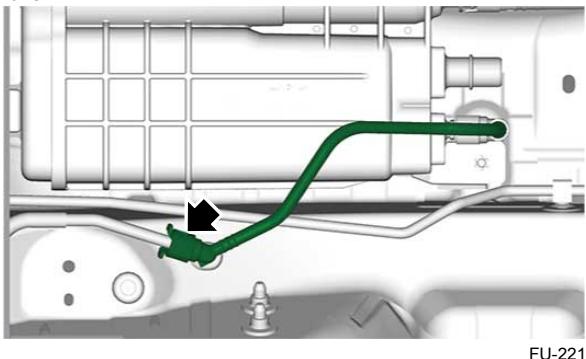
FU-22147

14. Remove the fuel tank. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Tank>REMOVAL.](#)

15. Remove the hoses from the fuel tank. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>General Description>COMPONENT > FUEL TANK 1.](#)

16. Disconnect the purge tube from the fuel pipe assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>REMOVAL > QUICK CONNECTOR DISCONNECTION \(TYPE E\).](#)

ZD-8AU



FU-22148

17. Remove the leak check valve assembly. [Ref. to EMISSION CONTROL \(AUX. EMISSION CONTROL DEVICES\)\(H4DO\)>Leak Check Valve Assembly>REMOVAL.](#)

18. Remove the under cover rear LH. [Ref. to EXTERIOR/INTERIOR TRIM>Floor Under Protector>REMOVAL.](#)

19. Disconnect the brake hose and the brake pipe.

Brake hose:

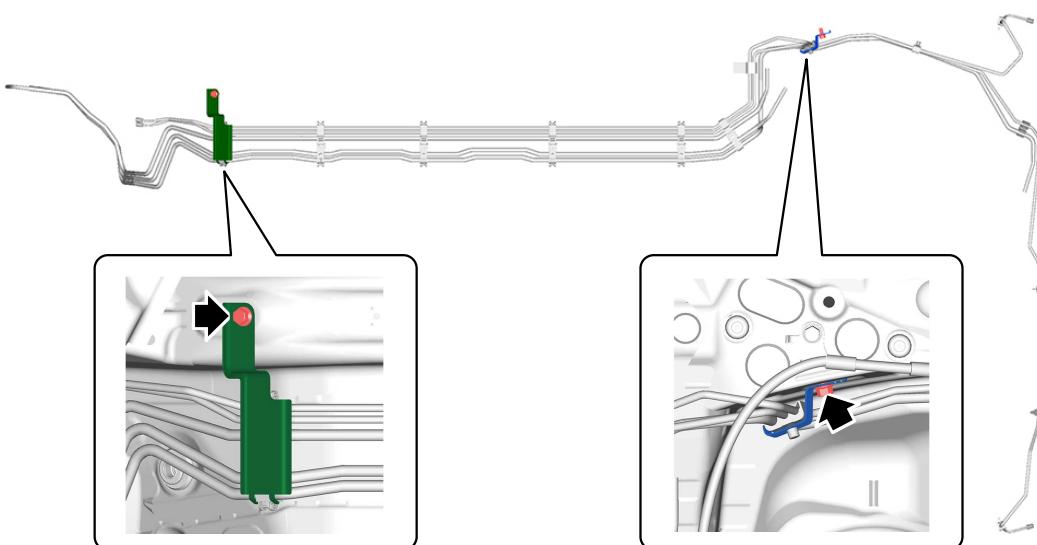
[Ref. to BRAKE>Brake Hose>REMOVAL.](#)

Brake pipe:

[Ref. to BRAKE>Brake Pipe>REMOVAL.](#)

20. Remove the bolts which secure the fuel pipe bracket front and the fuel pipe bracket rear.

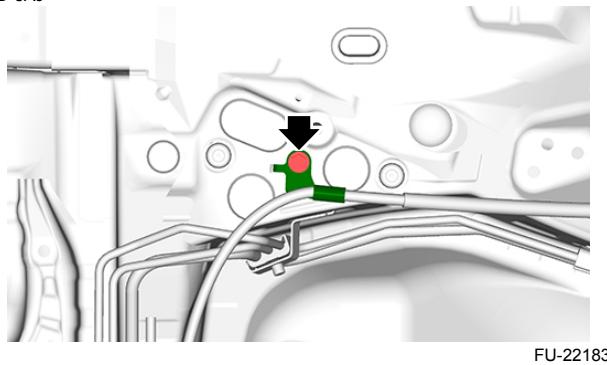
ZD-8AJ



FU-22016

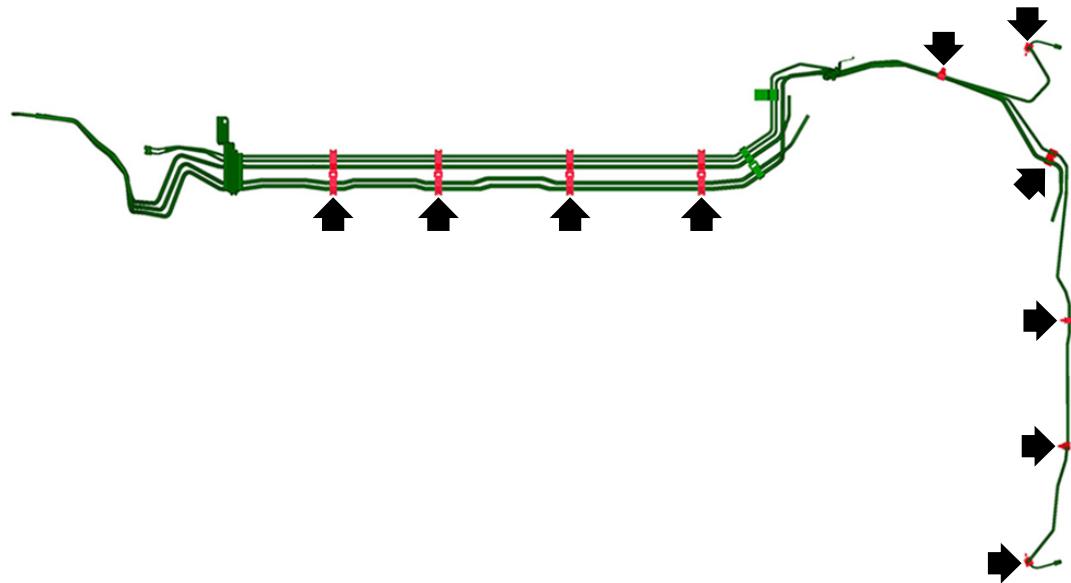
21. Remove the cable assembly hand brake LH bracket.

ZD-8AJ



FU-22183

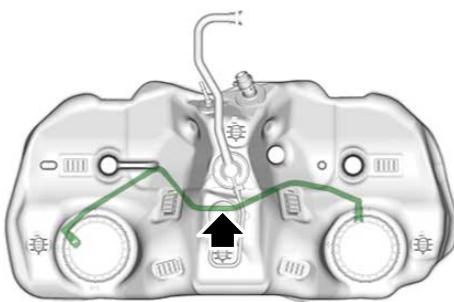
22. Remove the fuel pipe assembly from the vehicle.



FU-22017

23. Remove the fuel sub delivery tube.

- (1) Remove the fuel pump assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Pump Assembly>REMOVAL.](#)
- (2) Remove the fuel sub level sensor. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Sub Level Sensor>REMOVAL.](#)
- (3) Remove the fuel sub delivery tube from the fuel tank.



FU-22149

1. QUICK CONNECTOR DISCONNECTION (TYPE A)

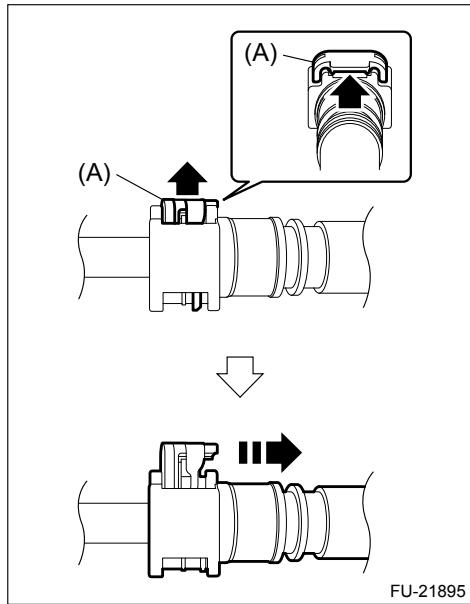
1. Disconnect the quick connector as shown in the figure.

Caution:

- Be careful not to spill fuel.
- Catch the fuel from the tubes using a container or cloth.
- Pull out the quick connector straight in the axis direction.
- When disconnecting the quick connector, do not bend or twist the tube forcibly. If the tube is bent, replace it with a new part.

Note:

Clean the pipe and quick connector, if they are covered with dust or dirt.

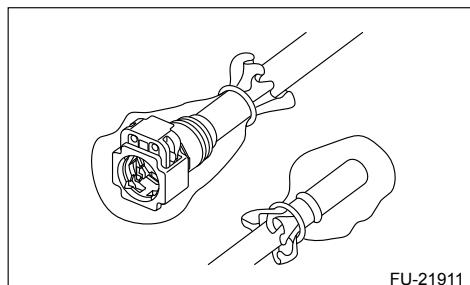


(A) Slider

- 2.** Protect the quick connector and pipe with vinyl or other materials.

Caution:

Do not damage the quick connector and pipe or allow foreign matter to enter the pipe.



2. QUICK CONNECTOR DISCONNECTION (TYPE B)

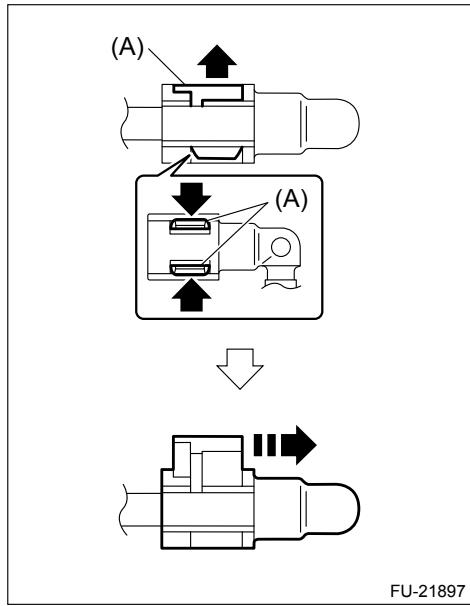
- 1.** Disconnect the quick connector as shown in the figure.

Caution:

- Be careful not to spill fuel.
- Catch the fuel from the tubes using a container or cloth.
- Pull out the quick connector straight in the axis direction.
- When disconnecting the quick connector, do not bend or twist the tube forcibly. If the tube is bent, replace it with a new part.

Note:

Clean the pipe and quick connector, if they are covered with dust or dirt.

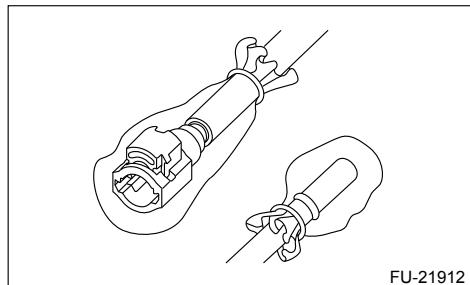


(A) Slider

- 2.** Protect the quick connector and pipe with vinyl or other materials.

Caution:

Do not damage the quick connector and pipe or allow foreign matter to enter the pipe.



FU-21912

3. QUICK CONNECTOR DISCONNECTION (TYPE C)

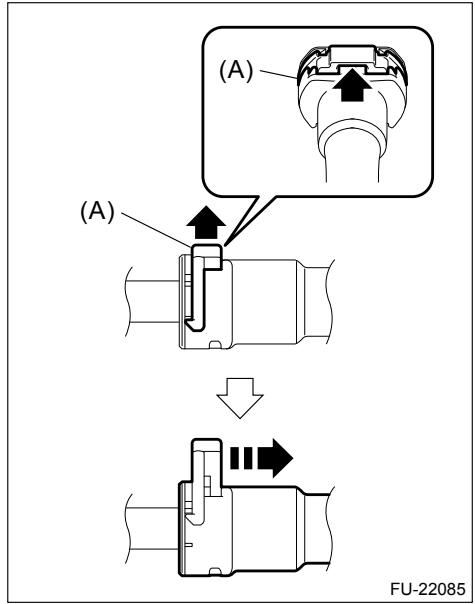
- 1.** Disconnect the quick connector as shown in the figure.

Caution:

- Be careful not to spill fuel.
- Catch the fuel from the tubes using a container or cloth.
- Pull out the quick connector straight in the axis direction.
- When disconnecting the quick connector, do not bend or twist the tube forcibly. If the tube is bent, replace it with a new part.

Note:

Clean the pipe and quick connector, if they are covered with dust or dirt.

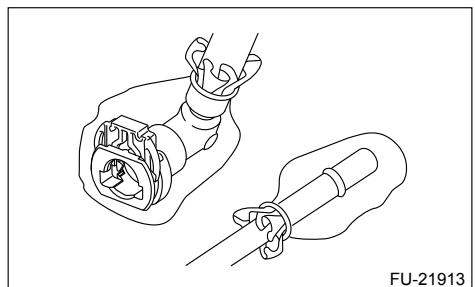


(A) Slider

- 2.** Protect the quick connector and pipe with vinyl or other materials.

Caution:

Do not damage the quick connector and pipe or allow foreign matter to enter the pipe.



4. QUICK CONNECTOR DISCONNECTION (TYPE D)

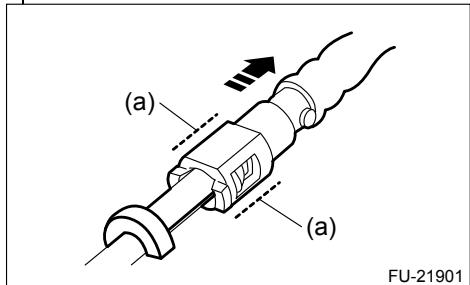
- When using ST
 1. Attach the ST to the pipe and push the ST in the direction of arrow mark to disconnect the quick connector.

Preparation tool:

ST: QUICK CONNECTOR RELEASE (42099AE000)

Caution:

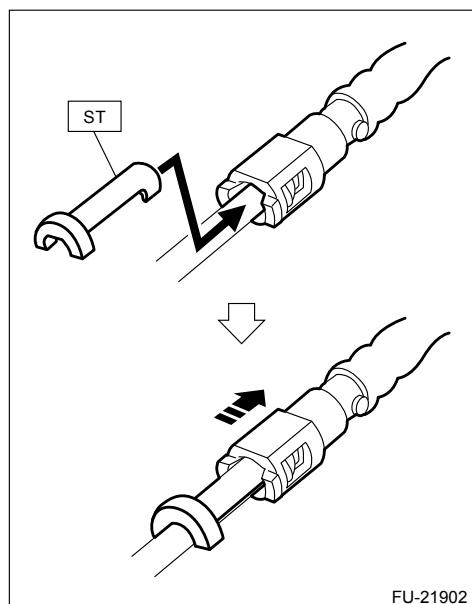
- Be careful not to spill fuel.
- Catch the fuel from the tubes using a container or cloth.
- If the quick connector and pipe are sticking to each other, push and pull the connector with the ST pushed, and then pull the connector after it starts moving freely.
- Pull out the quick connector straight in the axis direction by holding the section (a) as shown in the figure.



- When disconnecting the quick connector, do not bend or twist the tube forcibly. If the tube is bent, replace it with a new part.

Note:

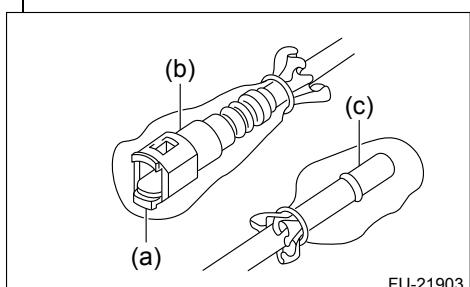
Clean the pipe and quick connector, if they are covered with dust or dirt.



2. Protect the quick connector and pipe with vinyl or other materials.

Caution:

- Do not damage the quick connector and pipe or allow foreign matter to enter the pipe.
- When reusing the retainer, do not disconnect the retainer from the connector.



(a) Retainer

(b) Connector

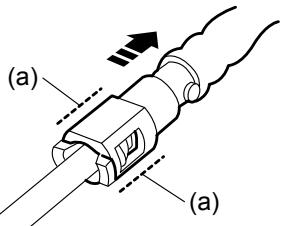
(c) Pipe

• When not using ST

1. Push the retainer in the direction of the arrow, disconnect the quick connector from pipe.

Caution:

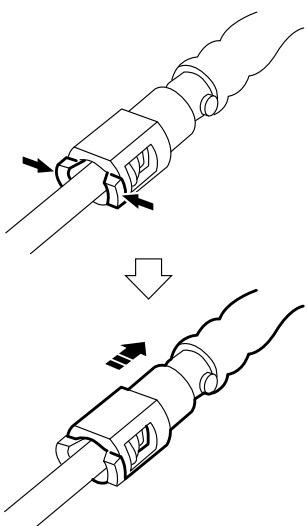
- Be careful not to spill fuel.
- Catch the fuel from the tubes using a container or cloth.
- If the quick connector and pipe are sticking to each other, push and pull the connector with the retainer pushed in the direction of the arrow, and then pull the connector after it starts moving freely.
- Pull out the quick connector straight in the axis direction by holding the section (a) as shown in the figure.



- When disconnecting the quick connector, do not bend or twist the tube forcibly. If the tube is bent, replace it with a new part.

Note:

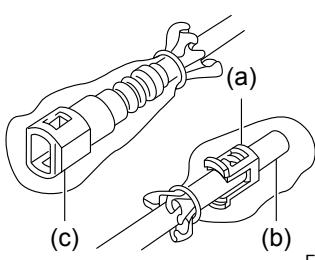
Clean the pipe and quick connector, if they are covered with dust or dirt.



2. Protect the quick connector and pipe with vinyl or other materials.

Caution:

- Do not damage the quick connector and pipe or allow foreign matter to enter the pipe.
- When reusing the retainer, do not disconnect the retainer from the pipe.



(a) Retainer

(b) Pipe

(c) Connector

5. QUICK CONNECTOR DISCONNECTION (TYPE E)

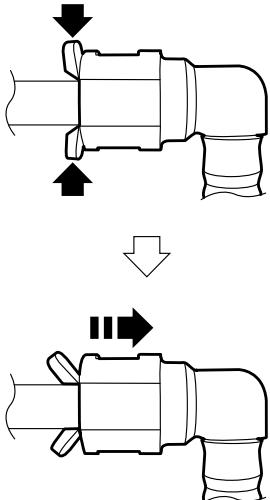
1. Disconnect the quick connector as shown in the figure.

Caution:

- Pull out the quick connector straight in the axis direction.
- When disconnecting the quick connector, do not bend or twist the tube forcibly. If the tube is bent, replace it with a new part.

Note:

Clean the pipe and quick connector, if they are covered with dust or dirt.

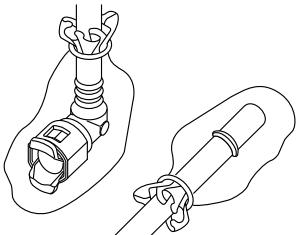


FU-21907

2. Protect the quick connector and pipe with vinyl or other materials.

Caution:

Do not damage the quick connector and pipe or allow foreign matter to enter the pipe.



FU-21914

6. QUICK CONNECTOR DISCONNECTION (TYPE F)

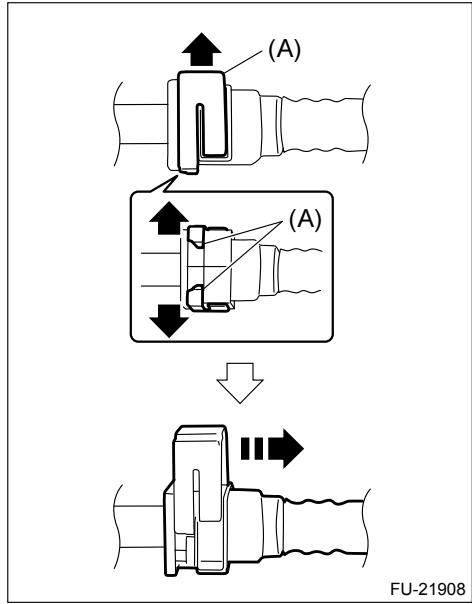
1. Disconnect the quick connector as shown in the figure.

Caution:

- Pull out the quick connector straight in the axis direction.
- When disconnecting the quick connector, do not bend or twist the tube forcibly. If the tube is bent, replace it with a new part.

Note:

Clean the pipe and quick connector, if they are covered with dust or dirt.

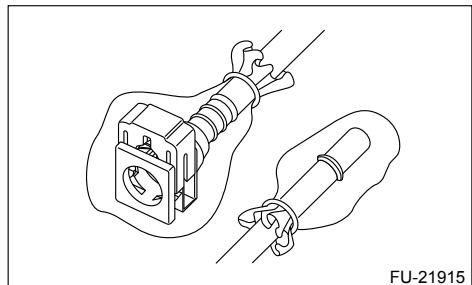


(A) Slider

- 2.** Protect the quick connector and pipe with vinyl or other materials.

Caution:

Do not damage the quick connector and pipe or allow foreign matter to enter the pipe.



FU-21915

7. QUICK CONNECTOR DISCONNECTION (TYPE G)

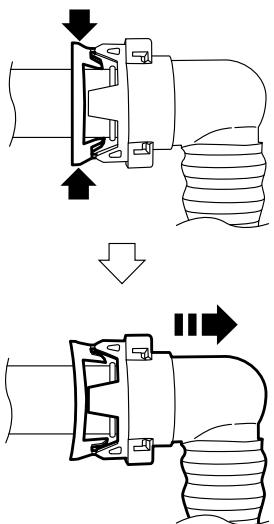
- 1.** Disconnect the quick connector as shown in the figure.

Caution:

- Pull out the quick connector straight in the axis direction.
- When disconnecting the quick connector, do not bend or twist the tube forcibly. If the tube is bent, replace it with a new part.

Note:

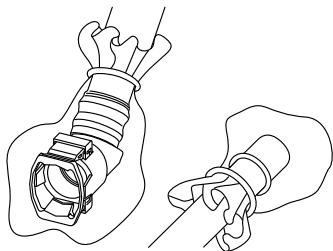
Clean the pipe and quick connector, if they are covered with dust or dirt.



2. Protect the quick connector and pipe with vinyl or other materials.

Caution:

Do not damage the quick connector and pipe or allow foreign matter to enter the pipe.



8. QUICK CONNECTOR DISCONNECTION (TYPE H)

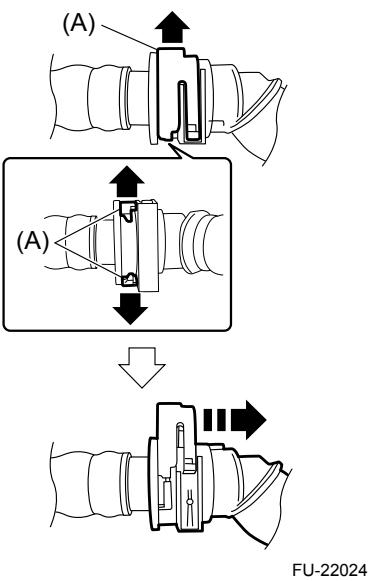
1. Disconnect the quick connector as shown in the figure.

Caution:

- Pull out the quick connector straight in the axis direction.
- When disconnecting the quick connector, do not bend or twist the tube forcibly. If the tube is bent, replace it with a new part.

Note:

Clean the pipe and quick connector, if they are covered with dust or dirt.

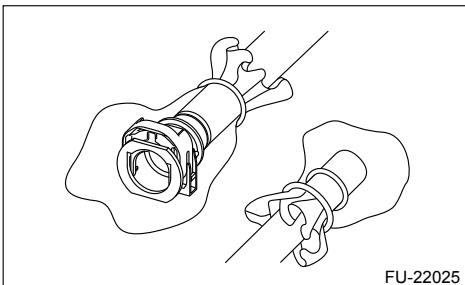


(A) Slider

- 2.** Protect the quick connector and pipe with vinyl or other materials.

Caution:

Do not damage the quick connector and pipe or allow foreign matter to enter the pipe.



FU-22025

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Delivery and Evaporation Lines

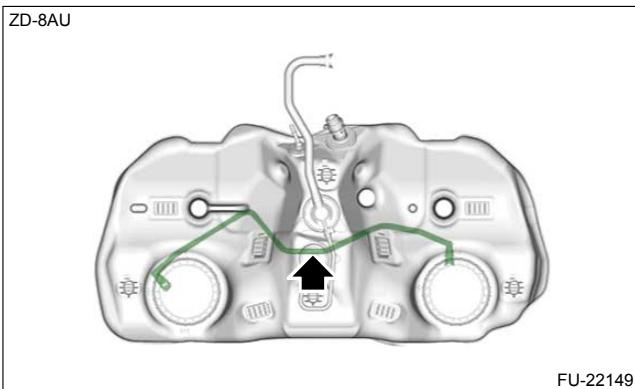
INSTALLATION

- 1.** Install the fuel sub delivery tube.

- (1) Set the fuel sub delivery tube to the fuel tank.

Note:

Check the fuel sub delivery tube to make sure it's not twisted.

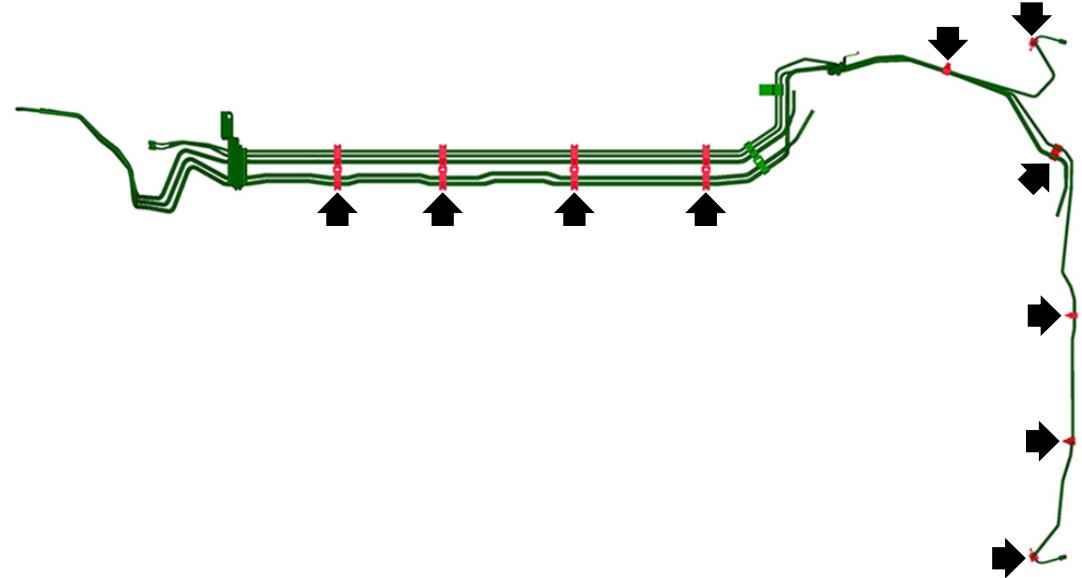


FU-22149

(2) Install the fuel sub level sensor. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Sub Level Sensor>INSTALLATION.](#)

(3) Install the fuel pump assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Pump Assembly>INSTALLATION.](#)

- 2.** Install the fuel pipe assembly to the vehicle.

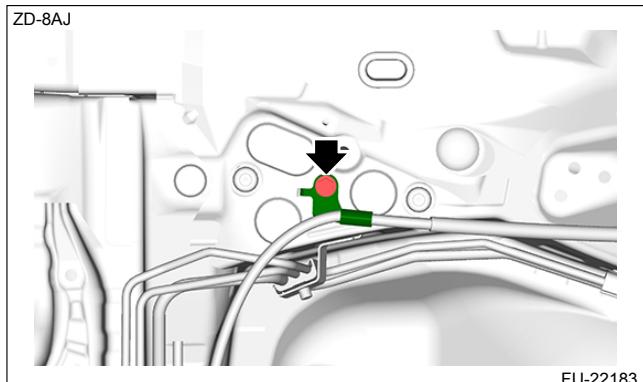


FU-22017

3. Install the cable assembly hand brake LH bracket.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)

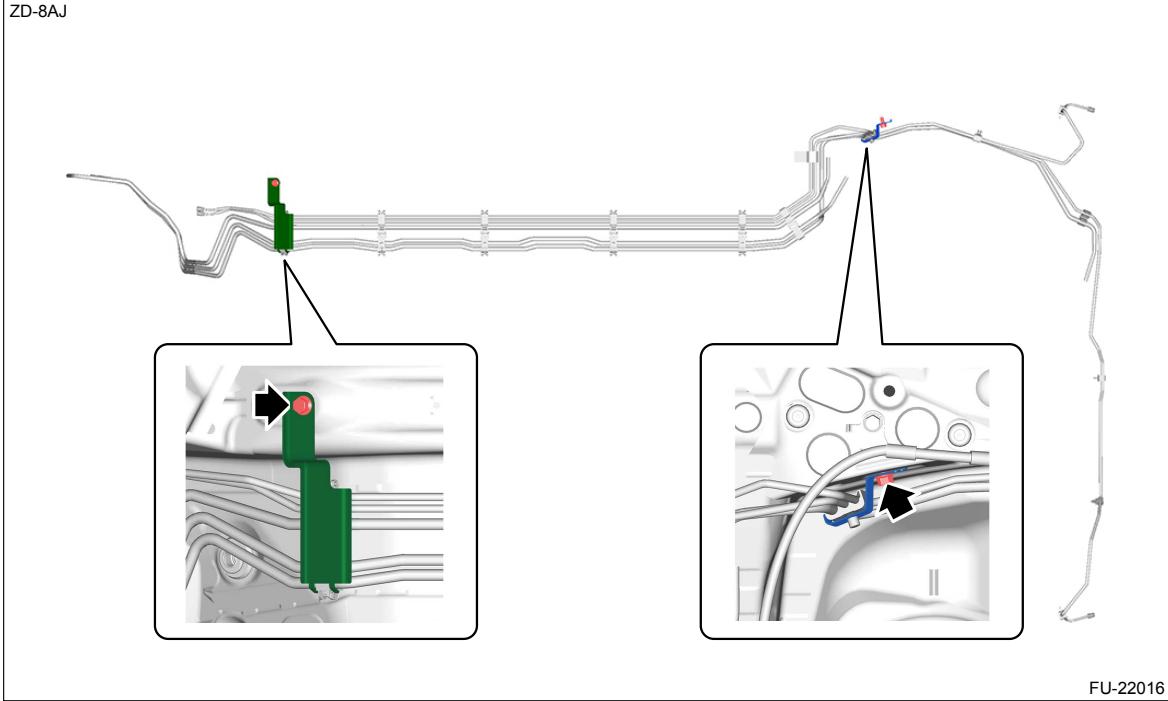


FU-22183

4. Install the fuel pipe bracket front and the fuel pipe bracket rear.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)



FU-22016

- 5.** Connect the brake pipe and brake hose.

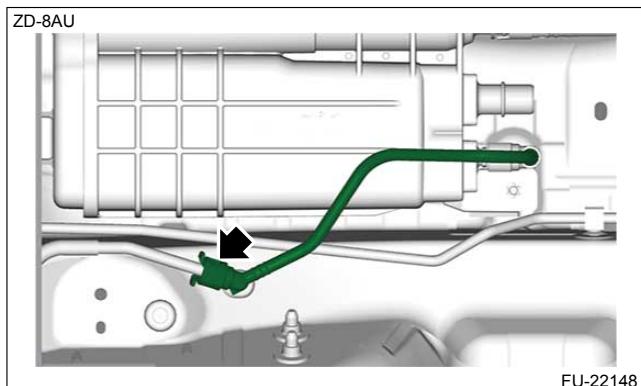
Brake pipe:

[Ref. to BRAKE>Brake Pipe>INSTALLATION.](#)

Brake hose:

[Ref. to BRAKE>Brake Hose>INSTALLATION.](#)

- 6.** Install the under cover rear LH. [Ref. to EXTERIOR/INTERIOR TRIM>Floor Under Protector>INSTALLATION.](#)
- 7.** Install the leak check valve assembly. [Ref. to EMISSION CONTROL \(AUX. EMISSION CONTROL DEVICES\)\(H4DO\)>Leak Check Valve Assembly>INSTALLATION.](#)
- 8.** Connect the purge tube to the fuel pipe assembly. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Delivery and Evaporation Lines>INSTALLATION > QUICK CONNECTOR CONNECTION \(TYPE E\).](#)



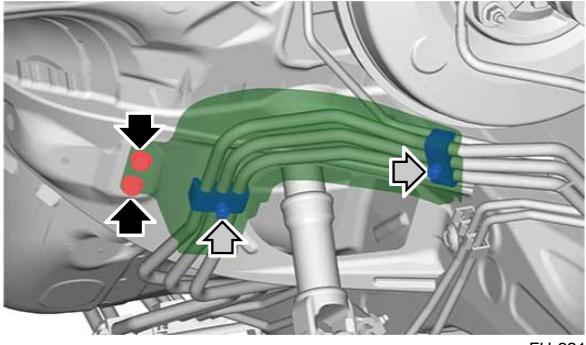
FU-22148

- 9.** Connect individual hoses to the fuel tank. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>General Description>COMPONENT > FUEL TANK 1.](#)
- 10.** Install the fuel tank. [Ref. to FUEL INJECTION \(FUEL SYSTEMS\)\(H4DO\)>Fuel Tank>INSTALLATION.](#)
- 11.** Install the pipe clamp to the fuel pipe assembly, and install the pipe protector.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)

ZD-8AU



FU-22147

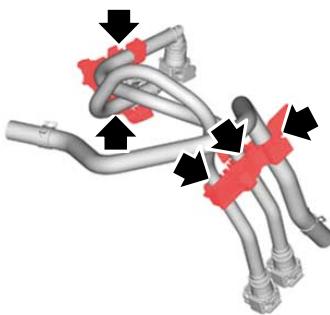
12.Install the ATF cooler (with warmer feature). (AT model) Ref. to AUTOMATIC TRANSMISSION>ATF Cooler (With Warmer Function)>[INSTALLATION](#).

13.Install the sub frame front LWR C COMPL LH. Ref. to FRONT SUSPENSION>Sub Frame>[INSTALLATION](#).

14.Lower the vehicle.

15.Install the fuel delivery tube clamp.

ZD-8A*



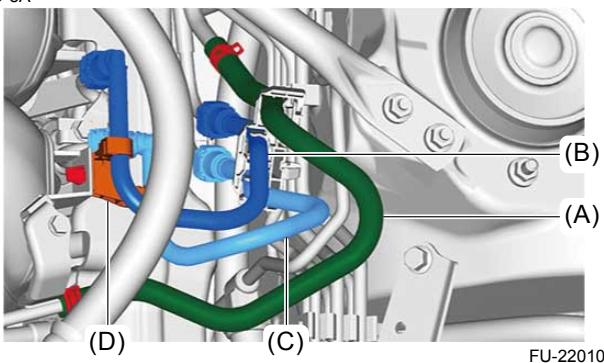
FU-22106

16.Install the fuel delivery tube clamp (D).

17.Connect the fuel delivery tube (port injection side) (C) and fuel delivery tube (cylinder direct injection side) (B). Ref. to FUEL INJECTION (FUEL SYSTEMS)(H4DO)>Fuel Delivery and Evaporation Lines>[INSTALLATION > QUICK CONNECTOR CONNECTION \(TYPE A\)](#).

18.Connect the evaporation hose (A).

ZD-8A*



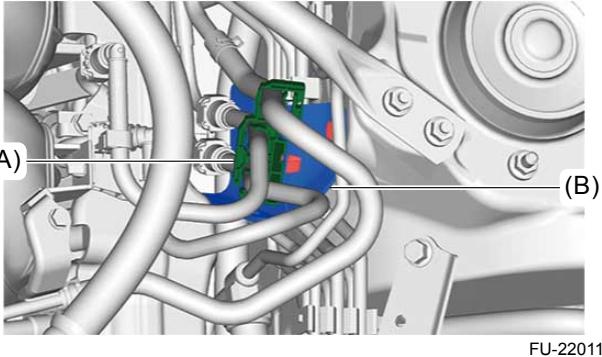
FU-22010

19.Install the fuel protector (B) and install the fuel delivery tube clamp (A).

Tightening torque:

7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

ZD-8A*



FU-22011

20. Install the fuel filler cap, and close the fuel filler lid.

21. Connect the ground terminal to battery sensor. Ref. to REPAIR CONTENTS>NOTE > BATTERY.

1. QUICK CONNECTOR CONNECTION (TYPE A)

- Check the seal surfaces of the quick connector and pipe for damage or deformation.

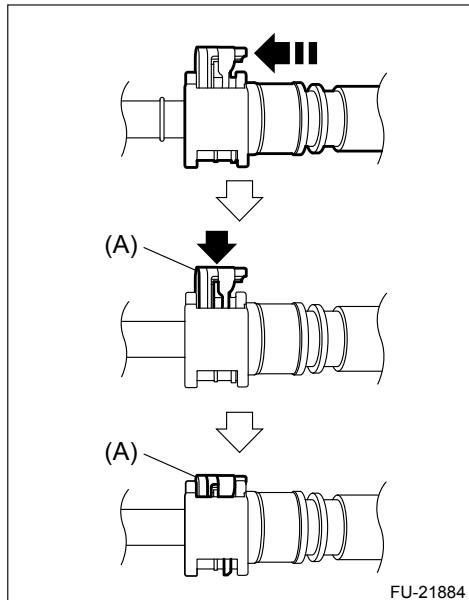
Caution:

Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.

- Connect the quick connector as shown in the figure.

Caution:

- Press in the quick connector straight in the axis direction.
- When connecting the quick connector, do not bend or twist the tube forcibly. If the tube is bent, replace it with a new part.
- When connecting the quick connector, make sure to insert it all the way in before locking the slider.
- When it is difficult to lock the slider, check that the connector is fully inserted.

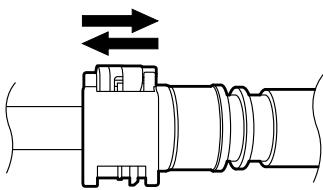


(A) Slider

- Make sure that the quick connector is securely connected by pushing and pulling the connector.

Caution:

- After locking the slider, pull the quick connector itself to the disconnecting direction, and then push to the connecting direction in order to confirm secure connection. Always make sure to perform this confirmation ending up with a pushing in.
- Be sure to inspect tubes and their connections for any leakage of fuel.



FU-21896

2. QUICK CONNECTOR CONNECTION (TYPE B)

- Check the seal surfaces of the quick connector and pipe for damage or deformation.

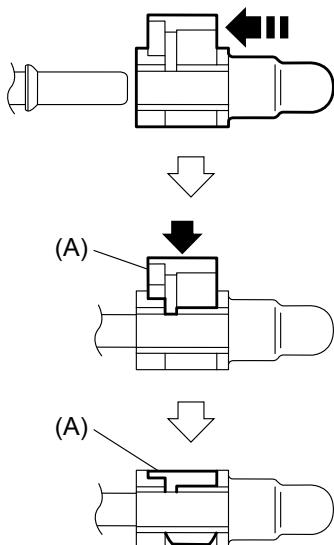
Caution:

Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.

- Connect the quick connector as shown in the figure.

Caution:

- Press in the quick connector straight in the axis direction.
- When connecting the quick connector, do not bend or twist the tube forcibly. If the tube is bent, replace it with a new part.
- When connecting the quick connector, make sure to insert it all the way in before locking the slider.
- When it is difficult to lock the slider, check that the connector is fully inserted.



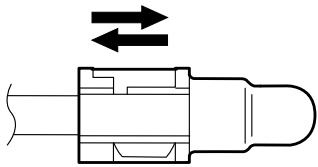
FU-21885

(A) Slider

- Make sure that the quick connector is securely connected by pushing and pulling the connector.

Caution:

- After locking the slider, pull the quick connector itself to the disconnecting direction, and then push to the connecting direction in order to confirm secure connection. Always make sure to perform this confirmation ending up with a pushing in.
- Be sure to inspect tubes and their connections for any leakage of fuel.



FU-21898

3. QUICK CONNECTOR CONNECTION (TYPE C)

1. Check the seal surfaces of the quick connector and pipe for damage or deformation.

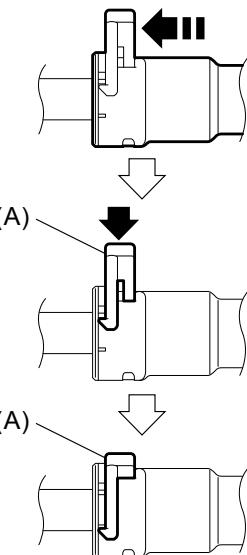
Caution:

Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.

2. Connect the quick connector as shown in the figure.

Caution:

- Press in the quick connector straight in the axis direction.
- When connecting the quick connector, do not bend or twist the tube forcibly. If the tube is bent, replace it with a new part.
- When connecting the quick connector, make sure to insert it all the way in before locking the slider.
- When it is difficult to lock the slider, check that the connector is fully inserted.



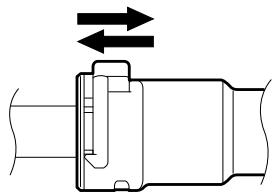
FU-22086

(A) Slider

3. Make sure that the quick connector is securely connected by pushing and pulling the connector.

Caution:

- After locking the slider, pull the quick connector itself to the disconnecting direction, and then push to the connecting direction in order to confirm secure connection. Always make sure to perform this confirmation ending up with a pushing in.
- Be sure to inspect tubes and their connections for any leakage of fuel.



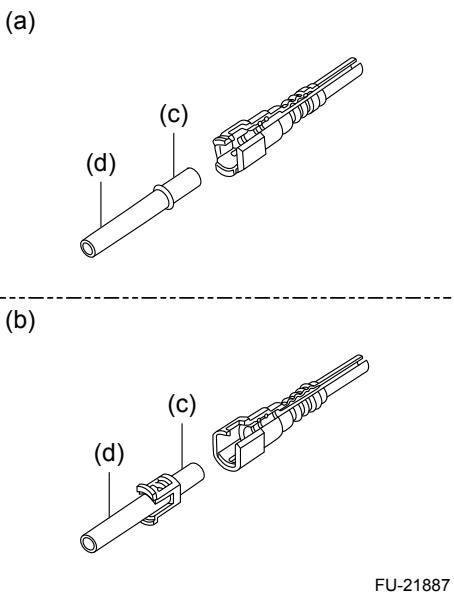
FU-22087

4. QUICK CONNECTOR CONNECTION (TYPE D)

- Check the seal surfaces of the quick connector and pipe for damage or deformation.

Caution:

Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.



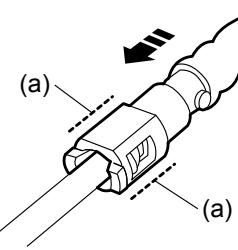
FU-21887

- (a) When removed using the ST (c) Seal surface (d) Pipe
(b) When removed without using
the ST

- Connect the quick connector as shown in the figure.

Caution:

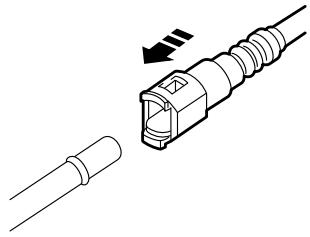
- Make sure the two retainer pawls are engaged in their mating positions in the quick connector.
- When reusing the retainer, make sure that neither scratches nor deformation exist on the retainer. If it is faulty, use a new part.
- Press in the quick connector straight in the axis direction by holding the section (a) as shown in the figure.



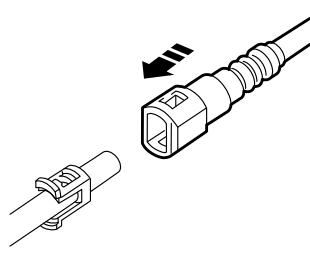
FU-21888

- When connecting the quick connector, do not bend or twist the tube forcibly. If the tube is bent, replace it with a new part.

(A)



(B)



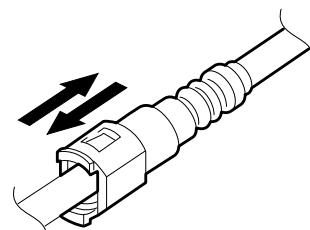
FU-21889

- (A) When removed using the ST (B) When removed without using
the ST

- 3.** Make sure that the quick connector is securely connected by pushing and pulling the connector.

Caution:

- After connecting the quick connector, pull the quick connector body in the removal direction and then push it in the connecting direction, in order to check that the quick connector is securely connected. Always make sure to perform this confirmation ending up with a pushing in.
- Be sure to inspect tubes and their connections for any leakage of fuel.



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5. QUICK CONNECTOR CONNECTION (TYPE E)

- 1.** Check the seal surfaces of the quick connector and pipe for damage or deformation.

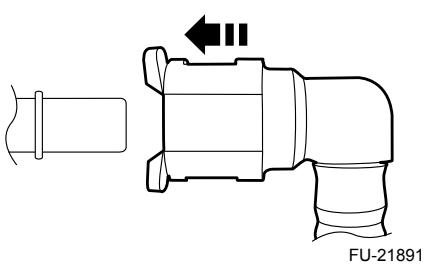
Caution:

Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.

- 2.** Connect the quick connector as shown in the figure.

Caution:

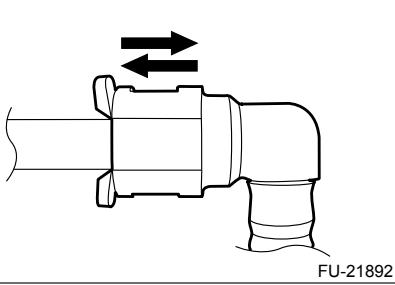
- Press in the quick connector straight in the axis direction.
- When connecting the quick connector, do not bend or twist the tube forcibly. If the tube is bent, replace it with a new part.



3. Make sure that the quick connector is securely connected by pushing and pulling the connector.

Caution:

After connecting the quick connector, pull the quick connector body in the removal direction and then push it in the connecting direction, in order to check that the quick connector is securely connected. Always make sure to perform this confirmation ending up with a pushing in.



6. QUICK CONNECTOR CONNECTION (TYPE F)

1. Check the seal surfaces of the quick connector and pipe for damage or deformation.

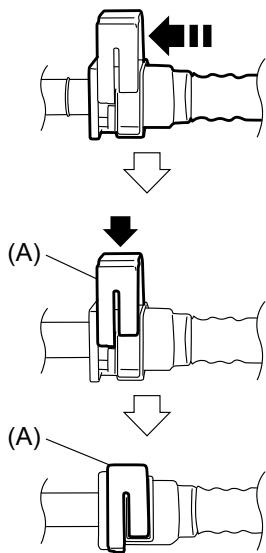
Caution:

Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.

2. Connect the quick connector as shown in the figure.

Caution:

- Press in the quick connector straight in the axis direction.
- When connecting the quick connector, do not bend or twist the tube forcibly. If the tube is bent, replace it with a new part.
- When connecting the quick connector, make sure to insert it all the way in before locking the slider.
- When it is difficult to lock the slider, check that the connector is fully inserted.

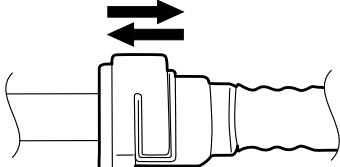


(A) Slider

- 3.** Make sure that the quick connector is securely connected by pushing and pulling the connector.

Caution:

After locking the slider, pull the quick connector itself to the disconnecting direction, and then push to the connecting direction in order to confirm secure connection. Always make sure to perform this confirmation ending up with a pushing in.



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7. QUICK CONNECTOR CONNECTION (TYPE G)

- 1.** Check the seal surfaces of the quick connector and pipe for damage or deformation.

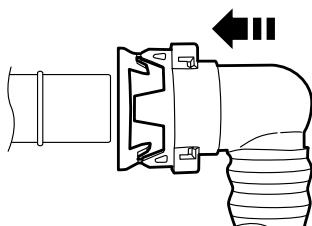
Caution:

Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.

- 2.** Connect the quick connector as shown in the figure.

Caution:

- Press in the quick connector straight in the axis direction.
- When connecting the quick connector, do not bend or twist the tube forcibly. If the tube is bent, replace it with a new part.

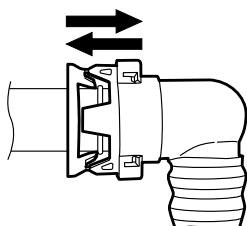


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- 3.** Make sure that the quick connector is securely connected by pushing and pulling the connector.

Caution:

After connecting the quick connector, pull the quick connector body in the removal direction and then push it in the connecting direction, in order to check that the quick connector is securely connected. Always make sure to perform this confirmation ending up with a pushing in.



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8. QUICK CONNECTOR CONNECTION (TYPE H)

- 1.** Check the seal surfaces of the quick connector and pipe for damage or deformation.

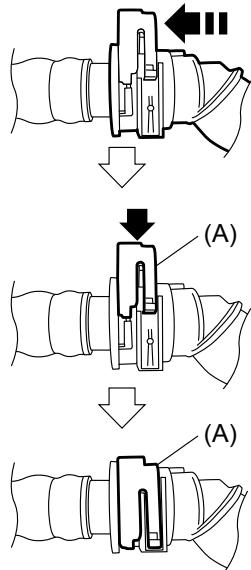
Caution:

Check that there is no damage or dust on the quick connector. If necessary, clean the seal surface of the pipe.

- 2.** Connect the quick connector as shown in the figure.

Caution:

- Press in the quick connector straight in the axis direction.
- When connecting the quick connector, do not bend or twist the tube forcibly. If the tube is bent, replace it with a new part.
- When connecting the quick connector, make sure to insert it all the way in before locking the slider.
- When it is difficult to lock the slider, check that the connector is fully inserted.

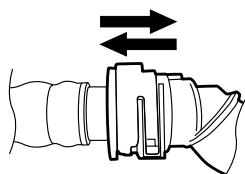


(A) Slider

- 3.** Make sure that the quick connector is securely connected by pushing and pulling the connector.

Caution:

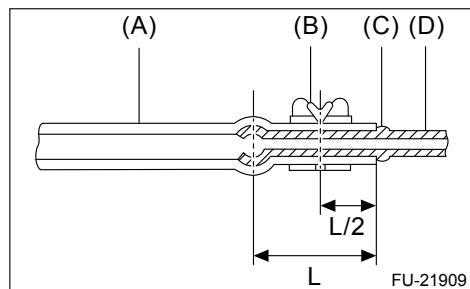
After locking the slider, pull the quick connector itself to the disconnecting direction, and then push to the connecting direction in order to confirm secure connection. Always make sure to perform this confirmation ending up with a pushing in.



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9. EVAPORATION HOSE CONNECTION

Connect by inserting it to the pipe until it reaches the spool or bump.



(A) Hose

(C) Spool or bump

(D) Pipe

(B) Clip

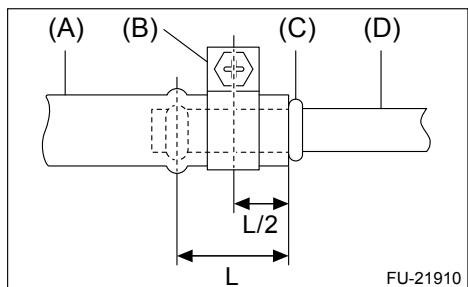
10. FUEL FILLER HOSE CONNECTION

• FILLER PIPE SIDE

Securely insert the hose to the spool, and then install the clamp as shown in the figure.

Tightening torque:

5 N·m (0.5 kgf-m, 3.7 ft-lb)



(A) Fuel filler hose

(B) Clamp

(C) Spool

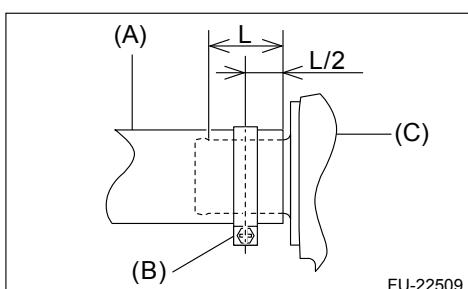
(D) Fuel filler pipe

• FUEL TANK SIDE

Insert the fuel filler hose and install the clamp as shown in the figure.

Tightening torque:

2 N·m (0.2 kgf-m, 1.5 ft-lb)



(A) Fuel filler hose

(B) Clamp

(C) Fuel tank

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Fuel Delivery and Evaporation Lines

INSPECTION

1. Check that the fuel pipe has no deformation, cracks or other damages.
2. Check that the hose and tube have no cracks, damage or loose part.

FUEL INJECTION (FUEL SYSTEMS)(H4DO) > Symptoms and causes

INSPECTION

Symptoms	Problem parts etc.	Possible cause
Insufficient fuel supply	Fuel pump fuse	Blown-out fuse
	Fuel pump relay	Faulty relay operation
	Fuel pump	Faulty pump operation
		Poor contact of connector
	Fuel filter	Clogging of filter
	Fuel injector	Clogging or malfunction of fuel injector
	Fuel line pipe, hose or tube	Clogging or deformation of pipe, hose or tube
	Pressure regulator	Seized or damaged diaphragm
Fuel leakage	Air in the fuel system	Fuel percolation or excessive fuel shortage in tank
	Fuel pump assembly	Defective gasket or improper installation of fuel pump assembly
	Fuel sub level sensor	Defective gasket or improper installation
	Fuel line pipe, hose and tube	Hole, cracking or improper installation of pipe, hose or tube
Gasoline smell inside of compartment	Fuel tank	Hole, cracking in tank
	Fuel line pipe, hose and tube	Hole, cracking or improper installation of pipe, hose or tube
	Service hole cover	Deformed cover or improper attachment of butyl tape Caution: Check that no fuel leakage occurs.
Noise	Saucer COMPL	Damage or improper installation of saucer
Defective fuel gauge display	Fuel level sensor or fuel sub level sensor	Poor contact at resistance part
		Seized or deformed arm
		Deformed or damaged float
		Connector connection is improper.
	Combination meter	Defective combination meter
Noise	Fuel pump	Defective pump or improper installation

Note:

- Water generated in the fuel tank may be frozen at cold condition.
It is preferable to keep the tank full with fuel if possible and to use a water removing agent or anti-freeze agent, etc. if necessary.
- If a water removing agent or anti-freeze agent, etc. is used, follow the instruction for use.